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ABSTRACT

One of a three-volume series concerning the development and testing of a model for determining the costs of vocational education programs and courses, this final report contains in its five chapters an introduction, a review of related literature and research, field tests, an added-cost model for vocational education, and a summary with conclusions and recommendations. Chapter 1 provides the background and scope of the study along with the process management plan; chapter 2 presents a review of related literature and research relevant to project purposes; chapter 3 reports the preliminary model development and pretest activities along with the site selection and the results of the national field tests; chapter 4 describes and presents the added-cost model; and chapter 5 offers a summary along with conclusions and recommendations emanating from the research and development activities. (The conclusions address the specific areas of program data, student accounting, and fiscal accounting.) Appended are a list of participating educational agencies and principal site consultants, a list of the model review panel, and abstracts of the functioning of the site schools. (VB)

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THE DEVELOPMENT AND TESTING OF
A MODEL FOR DETERMINING THE COSTS OF
VOCATIONAL EDUCATION PROGRAMS AND COURSES

FINAL REPORT

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Paul M. Starnes, Assistant Investigator
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U.S.O.E. Contract #300760410

CE 015 833

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U S DEPARTMENT OF HEALTH,
EDUCATION & WELFARE
NATIONAL INSTITUTE OF
EDUCATION

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CHAPTER 1

INTRODUCTION

Background

Analyses of program costs is an art as old as civil government organization itself. Like other developmental practices, the state-of-the-art changes as a function of recognized need among practitioners. Although Chapter 2 of this report addresses the technical issues related to cost analysis techniques and strategies for their application, it is important at the outset of this report to understand the context within which the study was initiated.

The Bureau of Occupational and Adult Education (BOAE) has for a number of years provided "seed" monies to state departments of education for the purposes of initiating and extending the uses of management information systems (MIS) associated with planning, evaluating, and managing vocational-technical education programs. The state-of-the-art of the MISs for vocational education was recently reported by Starr, Black, and Gray (1977). One finding of those researchers particularly related to our purpose of establishing the context of this study was the "...program cost data, essential for program planning purposes, were found in the data base of only 12 states."

The development and maintenance of comprehensive management information systems are no mean tasks. Although the above cited researchers also reported that "only 6 states had adequate or near adequate MIS data bases," they also reported that BOAE initiatives under Part C grants for FY 1974 and FY 1975 directed to MIS purposes did "improve availability of data for program planning and/or evaluation." Therefore, this study may be viewed as another step toward developing greater sophistication among vocational education program planners and managers.

Comprehensive studies of related costs of educational programs are of more recent origin. Although the notions of added-costs or cost differentials may be appropriately credited to Mort's early work on The Measurement of Educational Need (1925), it was the U.S.O.E. sponsored National Educational Finance Project which in 1968 mounted a major research effort to determine relative costs of vocational education offerings in relation to other programatic areas. Stimulated by the NEFP effort, other researchers have replicated, modified, and extended that thrust such that our understanding of vocational program cost issues is growing. And, based upon those analyses of program cost relationships, several states have adopted the cost differential (added-cost) type of public school finance funding system, and the federal government has based its support of programs for exceptional children on the added-cost concept (P.L. 94-142). Yet, only one state, Florida, has established a procedure for annually reviewing costs of each vocational education course offered in each of the state's school districts and community college districts.

It was within this context, one of need and one of developing sophistication, that BOAE sought a generalizable model for determining the added-costs of vocational education programs and courses.

Scope of the Study

The tasks to be performed in this study were four-fold; yet each related to the development and field-testing of an added-cost model for vocational education programs. The specific dimensions of the study were as follows:

(1) to develop a model for calculating the total costs on a full-time-equivalent per student basis for vocational and postsecondary school level courses and programs, and which will permit the analysis of these costs in terms of the basic school program costs;

(2) to demonstrate the capabilities of the model by using the model to gather and report the vocational program cost data on a number of selected school districts for secondary level offerings and for a number of postsecondary institutions. Further, this task included the reporting of "basic" program costs for one school district and one postsecondary institution;

(3) to describe how the model can be used to construct various added-cost systems of financing programs of vocational education; and,

(4) to describe the characteristics and components of a financial and student accounting system which would provide the data required by the model.

Further, the study was delimited in terms of the data capabilities of the model, the process characteristics of the model, program cost calculations, and field-test site selection. Each of those delimiters is discussed below.

Data Capabilities of the Model

The model was planned to have the capability of yielding:

(1) the total full-time equivalent student enrollment for each vocational education course and program offering at the secondary and postsecondary school levels by school, school district or postsecondary

institution, and for the state as a whole;

(2) the total cost for each vocational education course and program offering at the secondary and postsecondary school levels by school, school district or postsecondary institution, and for the state as a whole;

(3) the total cost for each vocational education course and program offering per full-time equivalent student enrolled at the secondary and postsecondary school levels by school, school district or postsecondary institution, and for the state as a whole;

(4) the total cost per full-time equivalent student enrolled for basic secondary programs by school and by school district and for the basic postsecondary school program in postsecondary institutions offering a basic program; and,

(5) a comparison between the vocational program costs and the basic program costs.

Process Characteristics of the Model

The model was planned to have the following characteristics:

(1) may be applied by researchers in any state even though the existing financial and student attendance information maintained at the district or institutional levels do not provide the required data; and,

(2) the costs and manpower requirements of applying the model on a statewide basis are reasonable.

Program Cost Calculation

The model was planned to:

(1) identify costs for each course and program by the objects: salaries, employee benefits, purchased services, supplies and materials, other, and capital outlay; and,

(2) identify costs as direct and indirect expenses consistent with the object and function classifications of expenditures as set forth in Chapter 4, Financial Accounting Classification and Standard Terminology for Local and State School Systems, Handbook II, Revised, (OE) 73-11800.

Site Selection for Field-testing

Although the report on site selection for field-testing is contained in a subsequent chapter of this report, the delimiting criteria initially established were as follows:

(1) must be selected from no less than four states which are demographically diverse and do not predominately represent one geographical region of the United States;

(2) must be selected from areas representing a range of demographic and geographic conditions including inner city areas, rural, sparsely populated areas, suburban areas, wealthy and poor areas, areas representing high concentrations of minority students, and areas representing a range in occupational opportunity;

(3) school districts were to be selected which enrolled above 35 percent of their secondary students in vocational education programs;

(4) postsecondary institutions were to be selected which enrolled above 45 percent of their students in vocational education programs; and,

(5) the financial and student attendance information systems used in the school districts and postsecondary institutions selected were to represent a variety of practices.

Products of the Study

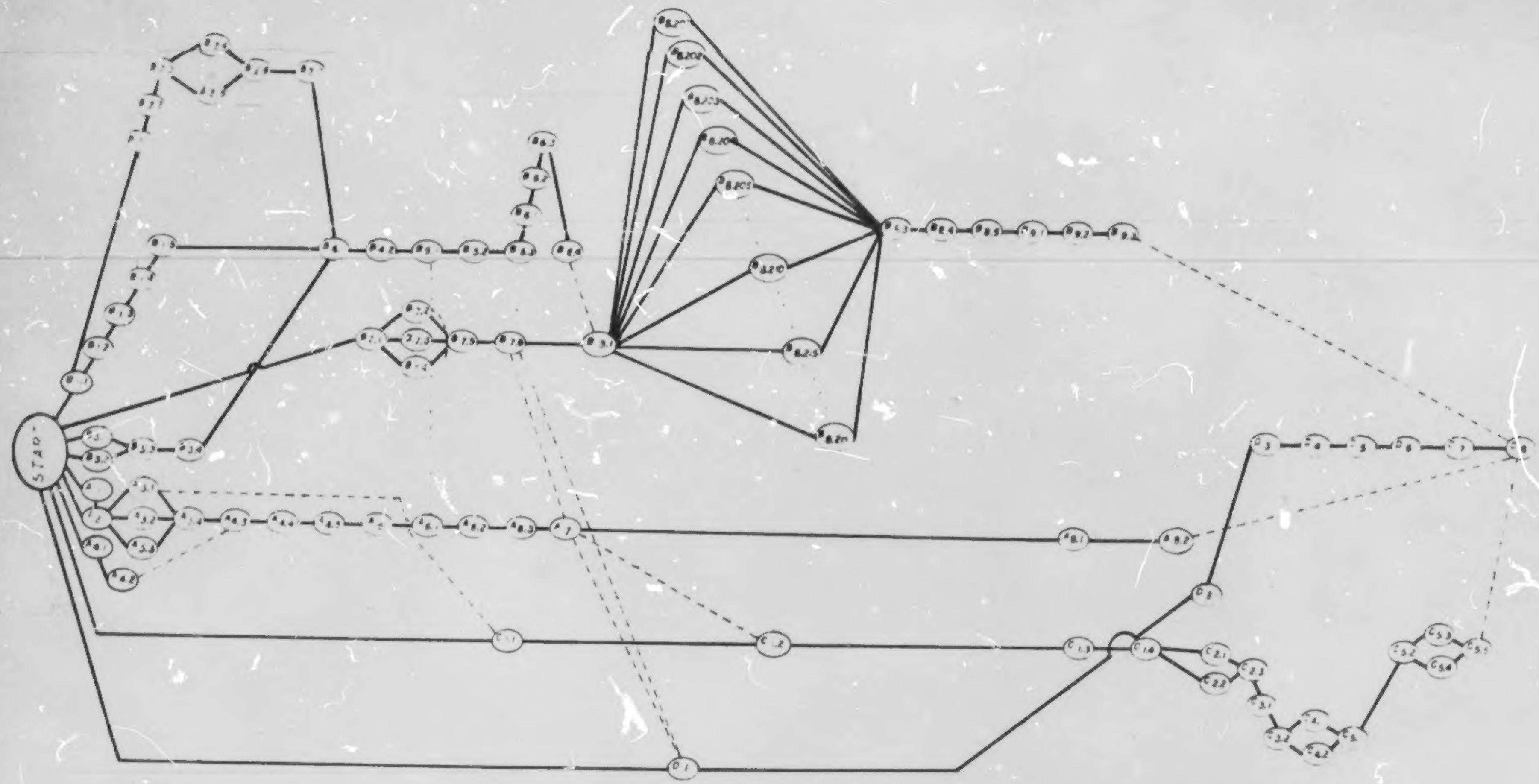
The study was planned to yield two products, (1) a Final Report and an Executive Summary, and (2) a User Manual. This document is the Final

Report and is characteristic research and development reporting in that it is process oriented. The first chapter provides the background and scope of the study along with the process management plan. Chapter 2 presents a review of related literature and research relevant to project purposes. The preliminary model development and pre-test activities are reported in Chapter 3 along with the site selection and the results of the national field-tests. The added-cost model, the second planned product of the study is included in this Report as Chapter 4. A summary is offered in Chapter 5 along with conclusions and recommendations emanating from the research and development activities.

The User Manual was planned to be a manual of instructions describing and illustrating how the model can be applied in: (1) determining added-cost elements, and (2) comparing such cost elements with those of basic programs" (RFP). Further, the model was designed to be applicable in a variety of educational settings, ranging from school districts, post-secondary institutions and states with unsophisticated financial and pupil attendance information to such agencies with sophisticated systems.

Project Management Plan

The initial conceptualization of the project management plan included project staff organization and role definitions and a statement of tentative tasks related to a Gantt Chart which displayed the tentative work schedule related to those tasks. However, the first status report to the project officer presented a comprehensive PERT diagram and schedule of project events, integrating project tasks. Although the time-frame offered was for a twelve-month period, it was agreed that a no-cost time extension may be necessary and indeed productive for project purposes. The latter portion of our management plan is included here to provide a gestalt of major project activities.


START
B 1.1
B 1.2
B 1.3
B 1.4
B 1.5
B 6
B 4.2
B 5.2
B 7.5
B 7.6
B 8.1
B 8.201
B 8.202
B 8.203
B 8.204
B 8.205
B 8.210
B 8.215
B 8.3
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C 1.1
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D 1
D 2
D 3

A MODEL FOR DETERMINING THE ADDED COST OF VOCATIONAL EDUCATION

U.S.O.E. CONTRACT NUMBER 300760410

INSTITUTE FOR EDUCATIONAL FINANCE

UNIVERSITY OF FLORIDA

GAINESVILLE, FLA.

SEPTEMBER, 1976

A MODEL FOR DETERMINING THE ADDED COST OF VOCATIONAL EDUCATION
USOE CONTRACT NO. 300760410
INSTITUTE FOR EDUCATIONAL FINANCE
UNIVERSITY OF FLORIDA, GAINESVILLE, FL
SEPTEMBER, 1976

	Pert Chart Node Designations	Estimated Completion Date
A.	Model Development	
A_1	Completion of Literature Review Program Cost Analysis/Accounting	9/15/76
A_2	Completion of Literature Review Pupil Accounting	9/15/76
A_3	Completion of Draft I Model Construction	10/15/76
$A_{3.1}$-	Vocational and Technical Program Dimensions Established	
$A_{3.2}$-	Data Elements of Interest (enrollment and cost) Established	
$A_{3.3}$-	Organizational Units Established	
$A_{3.4}$-	Model Construction, Draft I, Completed	
A_4	Panel Review of Draft I	10/20/76
$A_{4.1}$-	Consultation with Project Officer Relative to Selection of Panel Members	
$A_{4.2}$-	Review Panel Established	
$A_{4.3}$-	Submission of Model Construction, Draft I, to Panel for Review	
$A_{4.4}$-	Follow-up for Panel Review and Comments	
$A_{4.5}$-	Panel Comments Received and Reviewed	
A_5	Model Construction, Draft II, Completed	11/15/76
A_6	Presentation of Test Model to Project Officer	11/20/76
$A_{6.1}$-	Presentation of Written Report of Test Model and Field Sites and Procedures to Project Officer	
$A_{6.2}$-	Oral Presentation of Model and Field Test Sites and Procedures	
$A_{6.3}$-	Reception and Review of Comments of Project Officer	
A_7	Redraft of Model Completed	12/5/76
A_8	Redraft of Model Based on Field Test Results	4/20/77
$A_{8.1}$-	Field Test Results Reviewed	
$A_{8.2}$-	Redraft of Model Based on Field Test Report	

Pert Chart Node Designations	Estimated Completion Date
B. Model Testing	
B_1 Development of Lists of Field Test Sites	9/11/76
$B_{1.1}$- Set Up Meeting with Adult and Vocational Education Surveys Branch in the USOE	
$B_{1.2}$- Travel to Washington. Screening of NCES Data for Potential States and Districts to be Included in Sample	
$B_{1.3}$- Selection of Sites	
$B_{1.4}$- Preliminary Investigation at State Department of Education Level to Determine the Existence of Desired Range of Sophistication Regarding Financial and Student Attendance Information Systems	
$B_{1.5}$- Final Site Selection	
B_2 Gain Cooperation of Personnel at Field Test Sites	9/20/76
$B_{2.1}$- Set Up Appointments with State Department of Education Officials in Sample States	
$B_{2.2}$- Appointments with State Department of Education Officials to Secure Cooperation, Gain Information, and to Identify Proper Individuals to Contact in Governance Structure at the Local Level	
$B_{2.3}$- Development of Letter and Information Package to Send to Local Educational Agency Head	
$B_{2.4}$- Duplication of Package in $B_{2.3}$	
$B_{2.5}$- Letters Typed	
$B_{2.6}$- Letters and Packages Mailed	
$B_{2.7}$- Possible Follow-up Phone Calls	
B_3 Development and Description of Field Test Procedures	10/1/76
$B_{3.1}$- Development of Data Forms --- items, format, etc.	
$B_{3.2}$- Development of Interview Questions and Techniques	
$B_{3.3}$- Development of Manpower Strategy for Field Testing -- number, roles, time/field testing site	
$B_{3.4}$- Limited Duplication of Data Forms and Interview Techniques	
B_4 Preparation of Reports on Sites and Procedures	10/15/76
$B_{4.1}$- Compilation and Writing of Report	
$B_{4.2}$- Report Typed	

Pert Chart Node Designations	Estimated Completion Date
B_5 Presentation of Sites and Procedures Report to Project Officer	11/30/76
$B_{5.1}$- Submission of Report to Project Officer	
$B_{5.2}$- Travel to Washington to Confer with Project Officer	
$B_{5.3}$- Any Necessary Written and/or Telephone Communication	
B_6 Redraft of Sites and Procedures	12/1/76
$B_{6.1}$- Consultation Within the Institute for Educational Finance to Make Any Necessary Revisions in Sites and Procedures	
$B_{6.2}$- Duplication of Final Forms	
$B_{6.3}$- Pilot Test of Instruments	
$B_{6.4}$- Personnel-trained in Data Collection and Interviewing	
B_7 Develop Data Analysis Routines	12/31/76
$B_{7.1}$- Programming Assistance Secured	
$B_{7.2}$- Computer Access Secured	
$B_{7.3}$- Development of Dummy Data to Test Programming	
$B_{7.4}$- Development Programming Routines	
$B_{7.5}$- Test Programming	
$B_{7.6}$- Make Necessary Revisions in Programming	
B_8 Data Collection and Analysis	3/31/77
$B_{8.1}$- Organization for Data Collection	
$B_{8.201}$ through - Data Collection at Sites 1 - n $B_{8.2n}$	
$B_{8.3}$- Data Coding	
$B_{8.4}$- Data Key-punched	
$B_{8.5}$- Computer Analysis of Data	
B_9 Field Test Report	4/30/77
$B_{9.1}$- Charts and Graphs Prepared	
$B_{9.2}$- Report Written	
$B_{9.3}$- Report Typed	

Pert Chart Node Designations	Estimated Completion Date
C. Model Dissemination	
C_1 Development of User Manual - Draft I	5/20/77
$C_{1.1}$- Preparation User Manual - Draft I	
$C_{1.2}$- Redraft User Manual - Draft II	
$C_{1.3}$- Redraft User Manual - Draft III	
$C_{1.4}$- Draft of User Manual Completed	
C_2 Submission of Draft User Manual to Review Panel	5/31/77
$C_{2.1}$- Submission Draft User Manual to Review Panel	
$C_{2.2}$- Follow-up for Panel Comments	
$C_{2.3}$- Reception and Review Panel Comments User Manual	
C_3 Rewrite of User Manual	6/15/77
$C_{3.1}$- Modification User Manual	
$C_{3.2}$- User Manual Retyped	
C_4 Submission User Manual to Project Officer	6/30/77
$C_{4.1}$- Submit User Manual to Project Officer	
$C_{4.2}$- Reception and Review Project Officer's Comments	
C_5 Prepare Final Draft of User Manual	8/15/77
$C_{5.1}$- User Manual Rewritten	
$C_{5.2}$- User Manual Retyped	
$C_{5.3}$- Written Approval Project Officer Received	
$C_{5.4}$- User Manual Printed	
$C_{5.5}$- Approved User Manual Mailed to Project Officer	

	Pert Chart Node Designations	Estimated Completion Date
D.	Final Report and Executive Summary	8/15/77
D_1	Draft Final Report and Executive Summary Initiated	11/15/76
D_2	Redraft Final Report and Executive Summary	3/31/77
D_3	Draft Final Report and Executive Summary Completed	5/31/77
D_4	Submission Draft Final Report and Executive Summary to Project Officer	6/15/77
D_5	Reception and Review of Comments of Project Officer	7/7/77
D_6	Requested Changes Completed Final Report and Executive Summary	7/15/77
D_7	Written Approval Final Report and Executive Summary Received from Project Officer	7/27/77
D_8	Approved Final Report and Executive Summary Mailed to Project Officer	8/15/77

Finally, the project staff recognizes that without the efforts of many individuals located in school districts and postsecondary institutions project purposes would have been significantly deterred. Vocational program directors, school business managers (by various titles), and a large number of support personnel assisted research teams in gathering data and interpreting various data elements during the site visits. Many of those individuals are listed by name and position in the Appendices of this Report.

Also, the conceptualization of the research design and the interpretation of substantive issues related to the measures of added-cost are founded upon a body of research and related literature that preceded the activities reported here. Two unsigned papers, "Equalizing the Cost of Vocational Education (The Michigan Model)" and "Federal Funding of Community College Occupational Education" by the Michigan Department of Education, Vocational-Technical Education Service, (mimeo., 1974), were most valuable. Other researchers are noted in the chapter that follows.

REFERENCES

Mort, Paul R. *The Measurement of Educational Need*. New York, New York: Teachers College Press, 1925.

Starr, Harold, Black, M. S., and Gray, K. E. *Management Information System for Vocational Education: A National Study*. Columbus, Ohio: The Center for Vocational Education, 1977.

CHAPTER 2

REVIEW OF RELATED LITERATURE AND RESEARCH

Introduction

The matter of determining costs of vocational education is an important undertaking necessary for policy formulation and implementation. A wide variety of studies have either attempted to identify such costs and/or have contributed to definition of the problems inherent in such an endeavor. Such problems include (1) the variety of pupil accounting and fiscal accounting systems used in local educational agencies, with consequent difficulties in formulating cost equivalencies, (2) definitional issues, (3) determination of the most effective cost units for capturing and allocating costs, (4) determination of the cost centers which are most practical and useful, (5) definition and grouping of elements of cost, (6) means of allocating elements to units in relation to cost centers, and (7) special problems involved in treatment of start-up versus operational costs, and in the matter of equipment and capital outlay.

Accordingly, this review of literature relating to cost determination of vocational education will first address several vocational education cost studies and cost issues to provide a background of some major issues, techniques, and problems. The substantive review is topically organized as:

(1) cost accounting, cost analysis, and cost studies;
(2) cost units and considerations of such units;
(3) vocational program areas as cost centers;
(4) cost elements and classifications; and,
(5) cost finding and cost analysis.

Such a format should provide a comprehensive conceptualization of considerations involved in effective cost determination in vocational education.

Approaches that have been taken in studies that attempt to identify vocational education costs vary widely. This seems to be due in part to the difficulties commonly encountered with traditional record-keeping and accounting systems found in the schools and school districts. Although the items available for audit were similar, site to site, the techniques reported in existing studies to determine costs varied widely. The technique depended upon the views of the researcher with respect to elimination, consolidation, and/or averaging of existing data to establish a cost which is representative.

Kocinski (Gasior, 1975, p. 78) pointed out this problem and the concomitant one posed by the lack of consistency in reporting and record-keeping among the schools in a state or region. The commonly required reports to state and national agencies left sufficient leeway for local interpretation to allow these wide variations. She concluded:

> The studies cited indicate there is little agreement regarding underlying theory upon which to base study methodology and approach. Determination of educational costs is essentially a fact finding experience in which the investigators juggle the information obtained and obtainable into a form that is useful to their investigation. They offer little data that is generalizable and suggest to this researcher that one must create a model for data collection and analysis that circumvents the shortcomings of the methodologies mentioned. (Gasior, 1975, p. 85)

Gasior (1975, p. 55) agreed with Kocinski's conclusion and recognized the lack of consistency in choice of costing parameters among the research studies he reviewed. He stated similarly that each researcher appeared to have developed a structure suited to the objectives of each individual's study.

Humphrey's (1975) paper on cost analysis history and present inadequacies tends to agree. One of the major criticisms was that the current methods, in effect, moved funds from point to point in an effort to assign costs at the point of interest, and "all that is really accomplished is 'dividing the pie' and counting the pieces (p. 7)." Humphrey further maintained that cost analysis of instruction is conducted according to principles of teaching and learning which have often become historically dated; and that nontraditional educational programs using varied educational patterns and unique course designs cannot be evaluated with traditional cost analysis methods (p. 1). It was suggested that a thorough re-examination of instructional costing procedures was needed.

Stating that the technical processes for reporting instructional activities have remained essentially unchanged for 40 years, Humphrey saw this tradition as a major source of difficulty. According to him, there had been two types of work on educational costing: (1) efforts to systematize budget organizations and procedures, and (2) an intermittent concern for the ability to conduct cost studies. He described the 1935 National Committee procedures as complex and cumbersome. Two procedures, one described as the "short" process and the other as the "detailed" process, were categorized under his Type 1 effort to systematize. The "short" and "detailed" procedures follow.

The "Short" procedure: (1) The total instructional costs concept allocates charges for instructional overhead among departments and divisions using FTE students as the distribution parameter. (2) Instructional salary costs are assigned according to either student credit hours or FTE students. Unit costs are determined according to the same credit hour or FTE student parameters; i.e., instructional costs are a function of enrollment.

The "Detailed" procedure: (1) Faculty salaries and staff salaries are assigned according to units of time. (2) All other costs are allocated as unit costs which are calculated on a credit hour or FTE student basis; again, enrollment driven.

Similarly, Flynn's (1975) paper on educational cost analysis specified these limitations on use of budgets (budgeted expenditures) as the basis of cost estimations:

1. There is no assurance that program costs in different districts are computed in a comparable way.
2. Different accounting procedures and cost allocation rules tend to create artificial cost differences.
3. Regional differences in the cost of living causes tremendous differences in the true cost of programs.
4. Budgetary cost data does not properly include one-time capital expenses--first year has overstated costs due to equipment; other years have understated costs due to prior purchases.

In an earlier study, however, Kraft (1969) presented a different viewpoint. He believed the determination of specific costs for programs using information couched in the traditional accounting format posed less of a problem than did determining educational outputs. Kraft also stated that unless several variables were held constant, comparisons of costs among programs would not be valid. These variables, (a) size of school population, (b) hours of instruction, and (c) quality of equipment and materials, affect cost variations and must be taken into account when any comparisons are attempted.

Recent Cost Studies

Kim and Harris (1976) developed a cost-effectiveness model for secondary vocational education programs which included a cost analysis section pertinent to general vocational cost-finding principles. Their review of similar studies included salient points on cost analysis from Deucker and Altman (1967), Aldrich (1972), and Harris and O'Fallon (1973).

Kim and Harris defined program costs as "expenditures analyzed on a one-year basis without consideration of the present value of a multi-year cost." They divided program costs into direct and indirect cost categories as recommended in U.S.O.E. Handbook II. Direct costs of a vocational education program were defined as expenditures directly relating to the instructional program: salaries, employee benefits, purchased services, supplies and materials, capital outlay, and other expenditures. Their model included teaching salaries, fringe benefits, travel costs related to instruction, supplies and materials, classroom and laboratory facilities and equipment, and building use costs assigned to the program.

Kim and Harris' (1976) other data elements and program accounting units were: (a) average daily attendance (ADA) and average daily membership (ADM), (b) number of student contact hours, (c) number of full-time-equivalent (FTE) teachers, and (d) square footage of building space used for instruction.

They used the supporting services classifications in Handbook II, and prorated along the lines recommended in the Handbook:

1. Student services based on ADM;
2. Instructional staff services based on FTE teachers;
3. General administration based on ADM or FTE teachers (FTE teachers preferred);
4. School administration based on ADM or FTE teachers (ADM preferred);
5. Plant operation and maintenance based on either instructional hours, or by square footage of space used;
6. Pupil transportation and food services based on ADM ;
7. Fiscal operations, business services, central services--planning, research, and staff service--based on FTE teachers; and,

8. Statistical services and data processing services by ADM.

Their cost analysis procedures--a portion of their final model--appears later in the section on Costing Procedures.

The study conducted by Gasior and others (1975) in New Jersey involved development of a model for cost analysis of vocational education programs. The design called for data elements necessary to calculate cost per pupil in selected vocational education programs offered in two types of schools: area vocational schools and comprehensive high schools. The study examined per pupil costs of practical nursing and health related occupations.

Extensive and comprehensive literature reviews were conducted and reported in these areas:

1. Cost analysis of secondary school vocational-technical education programs
2. Financial support for vocational education in the public schools
3. Benefit-cost comparisons of vocational education programs
4. Systems for predicting costs of vocational education in community colleges
5. Analysis of vocational program costs. (p. 42)

Additionally, the bibliography of prior research studies was annotated, including for each cited study: (a) its purpose, (b) procedure followed, and (c) the findings and/or conclusions.

Based on this related research, Gasior's team elected not to categorize costs into direct and indirect cost classifications. Their study defined the object of investigation, operating costs, and proceeded to examine costs according to these recommended cost factor categories: (a) administration, (b) instruction, (c) attendance and health services, (d) transportation,

(e) operation of plant, (f) maintenance of plant, (g) fixed charges, (h) sundry accounts (food service, student activities, community service, and special projects), (i) debt service, (j) evening vocational school, (k) evening school for foreign-born, and (l) capital outlay. Equipment purchased to replace existing equipment was classified as operating expense, not as capital outlay.

The data elements identified for collection were:

1. Program-level expenditures: those relating equally to students enrolled in a program (salaries, teaching supplies, materials and equipment),
2. Building-level expenditures: those relating equally to all students in a high-school building,
3. Vocational building-level expenditures: those relating equally to all students in vocational education programs,
4. District-level expenditures: those relating equally to all the students in the district,
5. Pupil average daily attendance,
6. Pupil average daily enrollment,
7. Number of vocational teachers,
8. Total square footage of area used in vocational education programs,
9. Number of students in the programs being investigated,
10. Class hours per week for the number of weeks and number of school days in the year being examined, and
11. Equipment cost: cost per year obtained by dividing original cost of equipment by the estimated number of years of usage.

Gasior's procedures are included in the section titled Costing Procedures.

Swanson (1976) completed a study of costs, benefits, and effectiveness of vocational education (an eight-year, longitudinal study) in Buffalo, New York, detecting in the cost analysis phase a wide range of program costs among the schools studied. Swanson's study design took into account several important considerations either avoided, overlooked, or ignored by others. This researcher maintained that program costs and program expenditures are not necessarily the same. He viewed expenditures as referring to the dollar value of resources purchased during a given time period. Costs, however, were defined as the amount of resources consumed during a time period.

With respect to treatment of capital investment costs, the discrimination was clear. For purchases of items having a useful life of more than one year, the expenditures are likely to be considerably different from costs. Equipment and fixture costs were pro rated to annual cost equivalents by using the replacement value indicated in the district inventory. The replacement value was based on expected useful life schedules used by the Industrial Appraisal Co., Pittsburgh, Pa. Equipment was set at seven years and fixtures were set at ten years expected utility. Swanson set the cost of money at 5.6 percent, a consideration mostly ignored in other studies.

With the agreement of the various schools' business offices, the estimate for annual cost of rented space used for educational purposes was set at $2.00 per square foot. This was for space alone, not including utilities, maintenance or other associated costs which could be identified in annual expenditure reports.

Swanson chose to use average salaries of teachers as one data element. This choice was to prevent biasing the program costs due to variations in teacher salaries, which are dependent upon teacher training level and experience. The logic or argument presented to support this position was that the educational agency was purchasing a resource to preside over a class, and the experience and education of teachers are chance factors not dependent upon the program of instruction.

Program start-up costs were recognized by Swanson. He observed that

> There is a threshold cost for any program to bring together the necessary staff, equipment and space. Beyond this, the marginal cost per pupil is minimal until enrollment reaches a point where staff and facilities must be duplicated. (p. 13)

Conservation Horticulture served as an example: marginal cost between 19 and 20 students was $335, while the marginal cost of 0 to 1 student was $33,000: the threshold cost.

Finally, the issues, techniques, and problems associated with the general notion of vocational program cost analysis are both broad and deep. One conclusion is clear from the literature selected to provide background for this comprehensive review; the conclusion that cost analysis strategies are an art-form, subject to the whim and will of analysts. It is suggested that the foregoing caveat be foremost in mind as one proceeds through the literature review. Our purpose of course, is to provide rationale for our own selection of data elements and structure presented in Chapter 4 .

Cost Accounting, Cost Analysis, and Cost Studies

The research on the costs of education has depended upon a knowledge base stemming from two professions, accounting and education. There was a need for definition of terms prior to discussion of particular facets of educational cost. The following terms are provided:

Cost - The measure of an expenditure. (Finney and Miller, 1958, p. 502)

Cost accounting - That branch of accounting that deals with the classification, recording, allocation, summarization, and reporting of current and prospective costs. (Kohler, 1952)

Cost allocation - The distribution of the cost of a good or service or the total of a group of such costs over a number of secondary accounts, the purpose being to identify the cost with the product to which the goods or services have contributed. (Kohler, 1952)

Cost center - A division, a department or subdivision thereof, a group of machines or of men or of both, a single machine and its operating force, or any other unit of activity into which operations are divided for purposes of cost assignment and allocation. (Kohler, 1952)

Cost unit - The quantity or amount selected as a standard for the measurement of the cost of a given product or operation. The determination of cost per unit facilitates comparison with a standard cost, a past cost, or with the cost of a similar unit in another organization. (Kohler, 1952)

Depreciation - Loss in value or service life of fixed asset because of wear and tear through use, elapse of time, inadequacy, or obselescence. (Roberts and Lichtenberger, 1973)

Depreciation accounting - The systematic, periodic write-down or allocation, most frequently on a straight-line basis, or the cost of a limited-life asset or asset group, in conformity with the best available estimate of usefulness lost to date, remaining usefulness, and recovery values. (Kohler, 1952)

Depreciation expense - That portion of the cost or other basis of a fixed asset or fixed asset group charged against the operations of an accounting period; for a single year, the depreciation base times the depreciation rate; any provision for depreciation. (Kohler, 1952)

Direct cost - (1) an item of cost of materials or labor relating to or readily identified with a process, operation, item or product, or other cost unit; (2) those elements of expenditure which can be easily, obviously, and conveniently identified with specific activities or programs. (Roberts and Lichtenberger, 1973); they may be prorated as part of the cost of a product or service, department, operating unit, or program and are eliminated if a program is eliminated, or added if a program is added. (Hill, 1967)

Cost analysis - An assessment of the resource consumption patterns of an instructional operation (Blachke, 1975); (2) the disaggregation and recording of all of the cost elements incurred in the accomplishment of an activity.

Cost study - Research pertaining to (1) unit cost or total cost; (2) cost-benefit, and/or (3) cost-efficiency or cost-effectiveness.

Expenditures - charges incurred, whether paid or unpaid which are presumed to benefit the current fiscal year.

Indirect costs - Those elements of expenditure which cannot be readily or accurately traced or identified with a specific service, program, or unit of output, and are not entirely eliminated if a service, program, or unit of output is eliminated, not added because a program is added.

Program - A plan of activities and procedures designed to accomplish a predetermined set of objectives or set of allied objectives. (Hartley, 1968)

Prorated costs - The allocation of parts of a single expenditure to two or more different services or programs. (Roberts and Lichtenberger, 1973)

Standard cost - A forecast or predetermination of what costs should be under projected conditions, serving as a basis of cost control, and as a measure of productive efficiency when ultimately compared with actual costs. It furnishes a medium by which the effectiveness of current results can be measured and the responsibility for deviations can be placed. A standard cost system lays stress upon important exceptions and permits concentration upon inefficiencies and other conditions that call for remedy. (Kohler, 1952)

Cost accounting was developed in business enterprises as an extension of financial or general accounting. General accounting provided fiscal data from the standpoint of the major functions of the business, such as finance, administration, production and distribution (Blocker & Weltner, 1954). Although this information was found to be adequate for general control, there was no indication of the efficiency of these functions. A complete analysis of all costs involved, which could be obtained through cost accounting, had the added benefits of cost control, price determination, cost reduction, profitability analysis and inventory valuation (Chace, Schmiedickle, & Sherwood, 1964). Elements included in the field of cost accounting were identified by Kohler (1952) as:

> design and operation of cost systems and procedures, the determination of costs by departments, functions, responsibilities, activities, products, territories, periods, and other units of forecasted future costs and standard or desired costs, as well as historical costs; the comparison of costs of different periods, of actual with estimated or standard costs, and of alternative costs; the presentation and interpretation of cost data as an aid to management in controlling current and future operations.

Blocker and Weltmer (1954) noted the major functions of cost accounting as (1) allowing comparisons of divisions in order to determine their efficiency, (2) controlling costs through accumulation of cost data, (3) matching costs with revenue, and (4) utilization of cost data in special studies to formulate profitable operational policies.

The public sector, lacking the motive of profit maximization, had not placed the same emphasis on cost accounting as private enterprise. However, the absence of this emphasis did not negate its importance. With the advent of program budgeting systems in the past decade, the public schools had become increasingly aware of the need for cost accounting. Cost accounting in the public schools was generally limited to recording expenditures by program or activity as opposed to the private sector's concern with accounting for expenditures and matching these with revenue earned to determine profit. Knezevich and Fowlkes (1960) defined cost accounting in the public schools as "that branch of accounting concerned with searching out and reporting all elements of the cost incurred in executing a specific activity or a unit of work." The nature of the education system and the difficulty of quantifying the public benefits of education necessitated a much narrower definition of cost accounting for the public schools as compared to the elements identified by Kohler for the private sector. As Knezevich and Fowlkes pointed out, cost accounting for education came down to "recording how much was spent for definable areas of programs" (p. 152).

Advantages or values of cost accounting have been delineated for non-profit institutions. Macleod (1971) noted three--"efficiency and cost control, planning and allocating resources of people and funds, and 'pricing' for cost reimbursements." Conley (1974) in discussing the purposes of cost accounting for public school programs listed the following:

(1) To explain program operations and the purposes for which funds are used.

(2) To improve internal program efficiency by enabling careful examination of each cost item to see if the services could be performed or obtained at less expense through a change in operating procedures.

(3) To provide a basis for evaluating the effects of a program to ascertain if it warrants expansion, or contraction.

(4) To assist in comparing alternative ways of providing services to ascertain which alternative achieves the stated purposes at the least cost.

Cost accounting can be a valuable tool in managing a public institution.

There were two primary purposes of cost accounting associated with the educational enterprise. One purpose related to the control of organizational assets and the reports therefore primarily reflected descriptive data. The second purpose related to the analytical processes of decision-making whereby cost data became elements in a unit of analysis. The latter purpose included not only cost-effective and cost-benefit analyses but also included the economic notions of costs not normally associated with educational activity. Thomas (1971) was quite clear in his discussion of these different purposes and provided succinct illustrations of the effective differences resulting when one chooses one procedure over the other. A less detailed discussion of the differences, but an equally clear illustration, was provided by Warner (1970).

The measurement of educational program costs for the purpose of relating cost-differences between programs was more appropriately associated with the first purpose noted above, i.e., to reflect descriptive data. Given that purpose one may then dismiss those concepts associated only with economic cost (e.g., student foregone earnings and imputed social costs) and focus upon acceptable accounting practice for educational organizations. The latter arose from such works as Tidwell (1960; 1974), Alioto and Jungherr (1971), Lindman (1968), and Roberts and Lichtenberger (1965; 1973), and others.

Cost analysis, like cost studies, are then facilitated by cost accounting. Flynn (1975) reported that he viewed the traditional approaches to cost analysis as being limited to the systematic examination of annual budgets and expenditures. He further reported that such methods did not consider adequately either the cost of new capital expenditures or the current value of previously purchased items. Flynn stated that:

> To be truly useful, a costing methodology should be capable of meeting two requirements: (1) use for a research cost estimate designed to allow recommendations in general situations, and (2) use for a local cost estimate designed to allow recommendations in specific situations. (1975, p. 3)

Cost analysis research in education should have identified all costs of the resources required to conduct the programs. Costs of programs should have been calculated in such a manner that direct comparison between school districts was possible. This addition, according to Flynn, would have allowed corrections to be made for local cost variations dependent upon variable factors. To be meaningful, a cost analysis must have developed costs so as to eliminate the impact of characteristics differing from district to district (such as labor costs and inherited resources which just happen by chance to be observed in the selected districts).

Flynn suggested the use of district-wide budget costs for estimates of true cost implied that resources were used uniformly throughout a school or district, and this implicit assumption was not correct. An alternative, the resource approach to cost analysis, was suggested as the only method yet developed which accurately estimated the costs of educational programs on a meaningful and comparable basis.

The resource approach to cost analysis estimated costs by determining the quantity of resources. This involved these considerations:

1. The unit of resource and its associated unit cost must be determined.
2. For each type of resource, there are two kinds of unit cost: operating and capital.
3. Operating costs are annual and associated with consumption of benefits.
4. Capital costs are investments--benefits purchased to last several years--such as equipment, facilities, and staff training.

Flynn suggested that capital purchases are usually made with borrowed money which must be paid back over time (including interest). Considering the time-value of money, capital costs may have been amortized over the useful life of the investment by

$$\text{Equivalent Annual Capital Cost} = \text{Capital Cost} \times \frac{i(1+i)^n}{(1+i)^n-1}$$

where: n = the useful life in years

i = annual interest rate

and, since resources were shared by programs, the methodology used in the resource approach was

$$\text{Program Cost} = n_i\ p_i\ c_i$$

where: n_i = the total quantity of resource i available in the school

p_i = the proportion of resource i used in a particular program

c_i = the unit cost of resource i including annual operating cost and the equivalent annual capital cost (Flynn, 1975, p. 7).

Holleman (1975) sought to establish guidelines for accurate costing of public educational systems. The basic thesis was that all program expenses must be included in total cost, and three time-related costing areas must be taken into consideration.

Holleman's (1975, pp. 44-58) costing areas were:

1. Research and Development Costs--all costs incurred in the planning of a program, but not sunk costs (expenses of previous studies).
2. Investment Costs--capital, one-time, costs required beyond the development phase which introduce a new capability into operational use.
3. Operating Costs--the annual costs required to operate and maintain a given capability of an element throughout its projected life or operational use. There are two parts:

(a) A component of fixed cost--not dependent upon output--does not vary dependently with volume of output.

(b) A component of variable cost--dependent upon output--increases or decreases dependently with output.

Sunk costs were defined as costs incurred prior to the beginning of the analysis time period (Holleman, 1975, p. 58). Sunk costs were excluded unless incurred during the research and development and/or investment phases for the particular program being considered. Graphically represented on a time vs. cost coordinate system, the relationships of Holleman's three areas of cost were envisioned as noted in Figure 2.1.

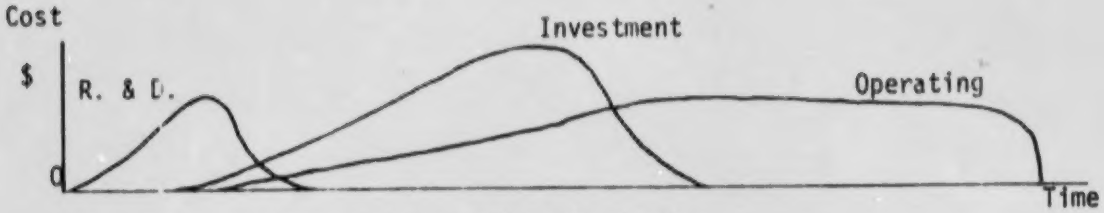

Figure 2.1--Life Cycle Costs

Cost Units

A major consideration in the determination of cost in education is the issue of what cost units should be used. There are arguments for teacher cost units, student units, other enrollment units, and time and space units. This section of the literature review will focus on some of the major units suggested in the literature, or actually used in cost studies.

It has been observed that unit instructional costs in education were computed as early as 1894 (Witmer, 1972). Ever since Strayer's (1905) study of city school expenditures and Elliot's (1905) study of comparative educational costs, the per unit costs of education have been studied continually. However, the more recent development of cost accounting has led to a call for more precise definition of units used in cost analysis.

Witmer found that the "Allen survey" of expenditures at the University of Wisconsin in 1915 expressed costs in terms of full-time students (costs per full-time student). A year later, 1916, the U. S. Bureau of Education expressed costs of education in the state of Washington in student clock-hour units. F. J. Kelly recommended in 1923 that credits be used as the cost-measuring unit because they were the "products" of higher education.

An early attempt to standardize this area occurred after Stephens and Elliott (1925) found that accounting system differences between institutions hampered their cost study efforts, and they recommended a standardization effort. The results of attempts to accommodate that recommendation appeared in reports by the 1932 National Committee on Standard Reports for Institutions of Higher Education. Two plans were outlined to establish a recognized technique for computation of unit costs such that the data would have meaning and value both internal and external to the individual institution. One plan advised dividing total educational and general expenditures by total full-time equivalent enrollment. The second plan advised the distribution of administration, library, and physical plant costs among instruction, research, extension services, and auxiliary enterprises in proportion to their respective budgets. The resulting total amounts in each category would then be divided by the full-time equivalent enrollment. The Committee also recommended unit cost calculations be done by department or by discipline, and according to level of instruction: graduate, upper-division undergraduate, and lower-division undergraduate.

The use of the professional position as a unit of measure was introduced in 1954 by Hungate (Witmer, 1972) who divided instructional expenditures by the number of full-time faculty. However, because of the changing mix of fixed, semi-fixed, and variable costs, changes in unit costs form an irregular pattern.

In some cases decreases in enrollment do not decrease total costs (Witmer, 1972, p. 118).

The "Council of Ten Study" (1955) established that:

(a) unit costs change as the student mix changes;

(b) unit costs are lowest where the number of curricula are lowest;

(c) significant variation in unit costs exists among institutions within given academic disciplines; and

(d) cost functions are curvilinear rather than linear.

The general concept of economies of scale was pointed out by Russell (1958) and by N. W. Hanson (1964). Their studies showed that larger schools generally had lower unit costs than smaller schools (Witmer, 1972).

Two studies of the higher education system in the State of Virginia, one by Russell(1965), and the other by Adkins and Walker (1967), used student-credit-hours produced as one unit of cost and full-time-equivalent (FTE) faculty as an alternative unit of cost. The FTE faculty statistic was utilized to provide a common basis for comparison for full-time and part-time faculty. Both part-time teachers and teachers not spending full time in teaching activities were included in the summaries of FTE faculty according to the percentage of full time each individual represented (Adkins & Walker, p. 4).

Coffelt's research (1968) also used the measuring units of student-credit-hours and FTE faculty. The study in Oklahoma utilized a slightly different manner of dealing with the relationship of part-time teacher activity and FTE faculty determination. FTE was assigned according to the proportion of time agreed to in the contract with the teacher. If no such agreement existed, FTE was assigned based on the ratio of hours taught to the normal teaching load at the institution.

Wells (1966) designed a study to determine the net cost of selected instructional programs at one of Los Angeles' junior colleges. This research first examined expenditures in terms of sources of support identified with student-contact-hours over a week's time for day courses, and then calculated the net cost per weekly student-contact-hours.

Robertson (1968) conducted a similar community college study in Michigan. The purpose was to develop an analytical system for computing per-student costs of curricular programs based upon expenditures, both actual program costs and what Robertson termed "policy cost." Policy cost was defined as the estimated cost of a program if existing policies had been rigidly followed.

Robertson defined the total teacher's compensation as including the primary contractual salary, supplemental contract amounts for teaching more than the normal teaching load, and fringe benefits. It was found that supplemental contract pay for teaching overload classes decreased the average cost per student-credit-hour, and the cost per student-credit-hour was much less when the courses were taught by part-time faculty. He concluded that the average cost per student-credit-hour varies in direct proportion with the number of single-section courses taught in a program. Collaterally, the incidence of multiple-section courses related to the cost of a student-credit-hour inversely: the more multiple-section courses taught, the lower the cost per student-credit-hour (p. 165). This finding, he concluded, impacts one-year and two-year programs requiring extensive laboratory hours, causing them to be more costly. More specifically, the factors tending to make these programs more costly were:

(1) a greater number of single section courses,

(2) a higher proportion of full-time instructors,

(3) a greater number of specialty courses, and

(4) a lower number of instructors having overload assignments. (p. 165)

Robertson argued, "Emphasis upon the student-credit-hour is necessary, as it is the only unit that can be measured in all community colleges which will serve the lay public, the legislator, or the administration as a basis for interinstitutional comparison" (1968, p. 39).

Robertson selected as cost factors: instruction, general support, and depreciation. The cost of instruction included contract salary, supplemental contract salary, and fringe benefits. The cost of general support was calculated by dividing the total general support expenses by the total number of student-credit-hours to establish a dollar rate per student-credit-hour. Depreciation was calculated in the same way: total depreciation expense divided by total student-credit-hours. Total program cost came from summing (pp. 88-89, 97).

Anderson's (1966) study of costs in junior colleges in California, Florida, Michigan, and New York resulted in an assertion that average cost per student-credit-hour is a function of these variables: salaries of instructors teaching courses in the curriculum, teaching load in total contact hours, class size, and cost of supplies and other supportive services for teaching.

Gerber (1968) calculated unit costs using teacher salaries only. Teacher salaries were allocated to the classes taught on a basis of the proportional relationship between the credit-hour value of each class and the standard teaching load.

Fowler's study (1970) of operations costs at eight carefully selected representative community colleges provided data on differential costs of liberal arts and vocational programs. The study determined the unit cost per credit-hour of each vocational program offered at the colleges and established cost ratios for these programs. Cost ratios were calculated by dividing the average cost of the transfer curriculum courses (liberal arts program) into each vocational program unit cost.

With liberal arts adjusted to unity, Fowler found that business occupations were 1.13, social and public service were 1.33, vocational (trades) were 1.51, health related occupations were 1.55, and technical occupations were 1.65 times the unitary cost (Fowler, 1970, p. 105).

The factors found to be contributing to the total expense of the college by percentage of cost were:

Auxiliary services	3.90 percent
Instructional resource center (Library)	5.34 percent
Student personnel services	8.37 percent
Instructional support services	9.86 percent
General administration	10.17 percent
Plant operation and maintenance	11.04 percent
Instructional salaries	51.31 percent

Fowler (1970, p. 108) found that the single most important factor affecting curriculum costs was the ratio of students to teachers. The research identified differential costs between levels of instruction within programs in that the second year of instruction costs more. There was also a direct relationship between equipment requirements of programs and their unit costs.

Wattenbarger, Cage and Arney (1970) participating in the same National Educational Finance Project special study with Fowler's assistance, reported these overall conclusions:

> 1. Most of the business oriented programs are comparable in cost to the liberal arts programs.
> 2. The liberal arts (transfer)* programs which emphasize science or engineering are more expensive than the general programs but less expensive than technical programs.
> 3. Special requirements such as rent on data processing equipment causes some programs to report a high cost differential.
> 4. New programs often have a higher cost differential during early years than will be true later.
> 5. Consideration of expenditures for capital outlay will increase the cost of a program as much as 22 percent in data processing, 21 percent in a machinist program or 20 percent in automobile mechanics. (p. 126)

Witmer's research review (1967) discussed unit costing in higher education and college record-keeping trends. It defined unit costs in higher education as the generalized quantifiable value of the resources invested and expended, divided by a standard quantifiable measure of output such as a contact period, credit, major program, curriculum, or student. Units were based on budgets and financial accounting records. With respect to college record-keeping on students the research spoke of two relatively new developments in 1967. One student registration was noted to be one enrollment by a student in one section or in one course division--a refinement of "student course" or the enrollment of a student in a course.

A "contact period" was a standard length of time (which varied from institution to institution but most often equalled 50 minutes) during which an instructor and one or more students are "face to face" for some educational purpose. "Contact period" had been carefully defined so as to subsume such inexact terms as "contact hour," "class hour," "clock hour," while leaving "hour" with its traditional meaning of 60 minutes. It should be noted that the term "clock hour" had been in use since 1916 (Witmer, 1967, p. 3).

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*Interpretation added.

Record-keeping variations had been encountered in so many cost studies since the early decades of this century that the difficulties associated with these variations had also been subjects to study. The earlier efforts of the National Committees on Standard Reports were continued in later years by associations faced with the problems of determining costs, what was being measured, and budgeting determinations. Humphrey (1975) referred to these efforts as the other approach to cost analysis--employing a relabeling procedure for essentially the same processes. He alluded to the National Center for Higher Education Management Systems (NCHEMS) procedures as an example.

It was the National Educational Finance Project (NEFP) centered at the University of Florida which in 1968 instituted a major research effort to determine relative costs of vocational-technical education as well as other educational program areas. From the time of these initial studies, the NEFP and its successor, the Institute for Educational Finance at the University of Florida, have conducted cost studies with data from all of the 50 states and have conducted in-depth studies in nine states during the past four years. As a consequence of these studies, cost differential (added cost) funding systems were recommended, based on the cost unit of the full-time equivalent student.

The rationale for the use of an FTE pupil cost unit in a cost differential type of funding formula is that such a framework provides school districts with greater flexibility in program operation, thereby encouraging exploration of alternative instructional methods based on educational needs. The overall approach also has the following advantages:

1. Local school districts have flexibility in program operation because funding is based on the pupil cost rather than a standardized self-contained classroom unit, thereby encouraging exploration of alternative instructional methods based on educational needs.
2. A uniform and comprehensive system of funding is established for all administrative levels of the educational system. Variations in allocations are dependent only on the differences in costs as reflected by the educational needs of students, programs, and school districts.
3. Funding through the cost differential method of weighting pupils increases the rationality and objectivity of the distribution system because allocation is based on actual cost analysis of educational programs.
4. A balanced program is created whereby the entire program is interactive with each component of the unit cost of the basic program, thus, a definitive relationship exists among all elements of the entire educational program.
5. The function of the state education agency is shifted to emphasize assistance to local school district program development.
6. The cost differential method of distribution creates a complete system in which allocation, program costs, and pupil costs are all related and subject to evaluation. Adoption of the cost approach facilitates constant evaluation of program cost variations and permits rational change and periodic adjustment. The approach further provides the cost basis for the establishment of an Educational Resource Management System.

The cost studies by the NEFP and the Institute for Educational Finance have therefore become widely used by states not only as models for educational cost accounting but also as the basis for more accurately relating educational need to the allocation of resources.

The initial cost studies by the NEFP extended from pre-kindergarten through the community college level, including special studies of vocational-technical programs. At the community college level wide-range costs were found among programs of such diverse nature as dental assistants, restaurant operation, secretarial science, and data processing. Cost differentials were determined for 56 programs, including both vocational-technical programs and a liberal arts (basic) program, in fifteen community colleges representing seven states. Program cost differentials were determined based on both a basic course cost and a department-wide cost. The results revealed that the average cost index for a liberal arts program with an emphasis on science engineering, as compared to the basic liberal arts program (1.00), was 1.12. Business administration programs with a cost index of .99, and general business programs with a cost ratio of .91, were the only two of the 56 programs that had ratios less than the basic program. Accounting with a cost index of 1.01 and business management with a ratio of 1.02 were also found to be relatively low cost programs. Of the occupational programs, those traditionally classified as business oriented courses were found to be the least expensive (Wattenbarger, Cage, and Arney, 1970).

Twelve of the fifteen community colleges offered a program in data processing. The average cost-index for this program was 1.26, although high pupil enrollments in several colleges showed the cost indices for the program to be generally less than the average (distribution skewed negatively). Costs for dental assistant and nursing programs varied greatly among the community colleges studied. In 13 nursing programs, costs were found on-the-average to be about one and one-half times as great as the basic program cost. Secretarial science programs were found to be relatively inexpensive.

In an in-depth study of vocational-technical education program costs in Kentucky, the Institute's staff found business education costs ranging from

1.39 to 1.95 times the basic cost of regular educational programs (grades 3-8). Cost ranges in other vocational programs were distributive education, 1.42 to 1.52; trades and industries 1.47 to 2.91; health occupations 1.42 to 2.67; agriculture 1.56 to 2.61 and home economics 1.38 to 1.68. From this analysis (Alexander and Jordan, 1973) the Kentucky Department of Education was able to recommend a reasonable range of cost factors in enacting its new state foundation program in 1974.

Several cost analyses were made in the State of Florida which have been utilized as the basis for legislation. One of the studies coordinated by NEFP at the University of Florida derived cost data from 25 school districts, with 9 large districts, 8 medium size, and 8 small districts being represented. Stratifying the sample by school district size assumed that relative program costs would vary according to district size, but this assumption was not entirely supported by the data (Johns, Alexander, and Jordan, 1973). The results indicated that cost variations were more dependent on several factors including number of pupils in program (often unrelated to enrollment), extent of population concentration, and extent of supportive staff including other professionals and teacher-aides. Cost analyses from this study provided the conceptual framework through which the new 1973 Florida education finance program was based.

Two followup studies were conducted to reevaluate the Florida vocational-technical education cost-indices in 1974 and again in 1975. These studies (Alexander, Jordan, and Patton, 1974) were necessary to evaluate the program cost relationships after implementation and to provide data for legislative adjustments. In order to more accurately determine costs, all vocational-technical courses, numbering some 380 in the state, were identified and coded.

From these course costs program costs could be developed. Five discrete steps were utilized to generate per pupil costs by both courses and programs and then compute the associated cost indices.

The steps included:

1. Determination of full-time equivalent (FTE) students
2. Determination of FTE teachers
3. Determination of total course/program costs
4. Computation of course/program costs per FTE student
5. Computation of course/program cost indices

Similar studies were completed by NEFP and Institute staff members and consultants in South Dakota (Alexander, 1973), Indiana (Jordan and Alexander, 1975), and Delaware (Alexander, 1973), and the Institute staff assisted state researchers in the Mississippi (Mississippi Public School Finance, 1973) and Texas (The Restructuring of Public Elementary and Secondary School Finance, 1974) studies. Technical assistance has been and continues to be provided by Institute staff and consultants to state departments of education, legislative committees, and school districts relative to program funding issues.

If pupil or student cost units were to be used, the matter of enrollment data, student accounting techniques, and definitional issues need to be explored.

Enrollment or pupil accounting methodologies and definitions have been standardized through U.S.O.E.'s Handbook V. The literature reports that most school districts use one or both of two pupil accounting methods--Average Daily Attendance (ADA) or Average Daily Membership (ADM). The selection of method is generally governed by state statute or regulation and is an integral part of the state-aid computation. The establishment of an alternative pupil accounting method has become prominent since states began adopting cost index funding methods following reports of studies by U.S.O.E. through the National Educational Finance Project. Since it was a primary objective of this project to develop a data base utilizing Full-Time Equivalency Enrollment as the pupil accounting methodology and since Handbook V does not contain such a definition, it was incumbent that a definition of Full-Time Equivalence Enrollment (FTE) be developed.

Handbook V is not entirely silent on this issue. Modification, combination and extension of the definitions given for Pupil, Full-Time and Pupil, Part-Time allows one to arrive at an operational definition of FTE for secondary school enrollments. Handbook V, Revised does provide an adequate definition of FTE student for community colleges (p. 118).

Pupil, Full-Time is defined in Handbook V as, "a pupil who is carrying a full course load as determined by the State or local school system". The phrase, "full course load" provides the needed concept; now, consider another Handbook V definition. Pupil, Part-Time is "a pupil who is carrying less than a full course load as determined by the State or the local school system." The phrase, "less than a full course load" distinguishes a part-time student from a full-time student. Given the discussion at the introduction of this section regarding program definitions, it is clear that few students enrolled in vocational and technical programs take a "full course load" in those programmatic areas since they must also meet Diploma (secondary) or Associate Degree (community college) general education requirements. However, the definition of a part-time student does not satisfy our requirements either since we are interested in knowing costs associated with the vocational and technical program areas as though students were enrolled full time. Therefore, we recognized that part-time enrollment is the modus operandi but we needed an operational definition of "full course load" and thereby accumulated part-time enrollments to establish the concept of full-time equivalency. Class hours per week (secondary schools) and student-credit-hours (community colleges) are the common methods used to convert part-time enrollments to full-time equivalency enrollments (FTE). For example, New Mexico law defined and FTE as "that average daily membership calculated by applying to the ADM in an approved public school program the ratio of the number of hours per school day devoted to the program to six hours or the number of hours per school week devoted to the program to thirty hours". Kentucky statutes provided that "Full-time equivalent means one pupil in attendance in a district for a minimum of 1,800 minutes per week". And, "Full-time equivalents for those enrolled in each vocational category...are obtained by dividing the attendance minutes per week in the program or class by a minimum of 1,800 minutes or the number of minutes per week that school is in session if greater than 1,800 minutes". Kentucky's definition was similar to New Mexico's since six hours per day for a five-day week is equivalent to 1,800 minutes (6 hrs. x 60 minutes x 5 days = 1,800 minutes per week). In Florida, "a full-time equivalent student is: a combination of full-time or part-time students in any one of the programs...which is the equivalent of one full-time student based on the following calculations: ...a fraction of a full-time equivalent membership in each...program equal to the number of net hours per week for which he is a member, divided by twenty-five; the difference between that fraction or sum of fractions and twenty-five twenty fifths of a week for each full-time student shall be presumed to be the balance of the student's time not spent in said...programs and shall be recorded as time in the appropriate basic program". The Florida definition was much more compatible for purposes of this study for two reasons. Firstly, the definition is complete by balancing students' nonprogram membership with special (vocational and technical) program membership. Secondly, twenty-five hours per week was accepted to be a much more realistic enrollment base since both senior high students and community college students more often than not carry a five course schedule as opposed to a six course schedule. The effect of New Mexico and Kentucky definitions would have been to understate program costs per student by approximately 10 percent. Also, Handbook II, Revised defines full-time equivalency as "the amount of time for a less than full-time activity divided by the amount of time normally required in a corresponding full-time activity" (emphasis added). Therefore, this research used the following equation for full-time equivalency pupil accounting.

$$FTE = \sum_{ij} \frac{SCHj}{25}$$

where,

SCH -- student contact hours per week in a course

j -- each vocational program area (agriculture, etc.)

i -- all vocational program areas offered in each school district/ institution studied.

However, adjustments were made in the above expression of FTE as regards Technical-Vocational Institutes (TVI) and Community Colleges (CC). Although the standard student-contact-hour is appropriate for TVI offerings, student-credit-hour is the measure used for CC offerings.

Summary

Over the years a number of cost units have been proposed and studied, including student clock hours, full-time equivalent enrollment, student credit hours, FTE faculty, student contact hours, contact period, and full-time-equivalent students based on student contact hours. Since instructional service outputs are for students, the more appropriate unit for study of cost would seem to be a measure of student service unit. The more precise and widely applicable cost unit of those reviewed appears to be the concept of the full-time-equivalent student, based on a standard number of student contact hours.

An exception to the above student service unit would be the allocation of services to teachers, such as inservice education, on a full-time-equivalent teacher cost unit basis. However, even here, it might be argued that the student is the indirect beneficiary.

The related studies indicate that several factors influence unit costs. Among these factors are student mix, number of curricula, number of single section courses, and utilization of teacher overload supplement arrangements and part-time faculty. Given these and other unit cost influencing conditions, it is incumbent upon the researcher to select the cost units which can most accurately reflect cost differences, thereby enabling closer study of conditions and factors contributing to such cost differences.

Vocational and Technical Program Areas

Issues relevant to program structuring have been adequately discussed by Hale (1971), Hartley (1968), Haggart (1969), Miller (1969), and others (1971). However, of primary concern of this dimension of the review are three basic reference guides produced by the U.S. Office of Education and one produced by the U.S. Department of Labor. These sources are:

1. Standard Terminology for Curriculum and Instruction in Local and State School Systems, Handbook IV, (Lichtenberger and Penrod, 1965)

2. Financial Accounting Classifications and Standard Terminology for Local and State School Systems, Handbook II, Revised, (Roberts and Lichtenberger, 1973)
3. Vocational Education and Occupations, and (U.S. Department of Labor, 1965)
4. Dictionary of Occupational Titles, third edition, volume 1 and volume 2. (U.S. Department of Labor, 1965)

The program structure addressed for the purposes of meeting the objectives of this project required the inclusion of all vocational program areas and a program designated as "basic program". The classification system utilized by the U.S. Office of Education to identify, classify and describe data elements relating to subject matter and curriculum activities in the vocational program area is as follows:

- Agriculture
- Distributive Education
- Health Occupations Education
- Home Economics
- Office Occupations
- Technical Education
- Trades and Industrial Occupations

Handbook II, Revised (p. 135) defined a program as "a plan of activities and procedures designed to accomplish a predetermined objective or set of allied objectives". Since it was not an objective of this project to aggregate costs of all activities engaged by the student to meet high school requriements for graduation or Associate of Arts requirements at the community college, but only those vocational sections, it was felt that the foregoing definition of a program was too broad. Therefore, to focus the program structure to the purposes of this project program definitions were selected from Vocational Education and Occupations.

Agriculture programs are comprised of the group of related courses or units of subject matter which are organized for carrying on learning experiences concerned with preparation for or upgrading in occupations requiring knowledge and skills in agricultural subjects. The functions of agricultural production, agricultural supplies, agricultural mechanization, agricultural products (processing), ornamental horticulture, forestry, agricultural resources and the services related thereto, are emphasized in the instruction designed to provide opportunities for pupils to prepare for or improve their competencies in agricultural occupations.

Distributive Education programs are designed to prepare individuals to enter, or progress or improve competencies in, distributive occupations. These programs include various combinations of subject matter and learning experiences related to the performance of activities that direct the flow of goods and services, including their appropriate utilization, from the producer to the consumer or user. The activities include selling and such sales-supporting functions as buying, transporting, storing, promoting, financing, marketing, research and management. In short, Distributive Education is comprised of programs of occupational instruction in the field of distribution and marketing.

Health Occupations Education programs comprise the body of related subject matter, or the body of related courses and understandings and skills required to support the health professions. Instruction is organized to prepare students for occupational objectives concerned with assisting qualified personnel in providing diagnostic, therapeutic, preventive, restorative and rehabilitative services to people, including understandings and skills essential to provide care and health services to patients.

Home Economics programs comprise courses and practical experience organized to provide opportunities for students to prepare for or advance in selected office occupations. Learning experiences are designed to lead to employment and/or advancement of individuals in occupations in public or private enterprises or organizations related to the facilitation function of the office.

Technical Education programs comprise that body of knowledge organized in a planned sequence of classroom and laboratory experiences, to prepare students for a cluster of job opportunities in a specialized field of technology. The program of instruction normally includes the study of the underlying sciences and supporting mathematics inherent in a technology as well as methods, skills, materials, and processes commonly used and services performed in the technology.

Trade and Industrial Occupations programs are concerned with preparing persons for initial employment, or for upgrading or retraining workers in a wide range of trade and industrial occupations. Such occupations are skilled or semi-skilled and are concerned with layout designing, producing, processing, assembling, testing, maintaining, servicing, or repairing any product or commodity.

Basic programs have been defined in a number of ways but where contrasted to vocational offerings (which are "basic" programs) then the definition must take on the denotation of general education. For purposes of studying public school finance it has been convenient to define the general education basic program in terms of various grade-levels depending upon the propensities of the states studied. For example, in the vocational education cost study of Florida the researchers used three groupings of basic programs: grades K-3, grades 4-10 and grades 11-12. However, excess-costs were related to the grades 4-10 basic program. In Indiana, grade grouping 1-6 was used as the base or basic program designation for costing purposes, while grades 3-8 were used for that purpose in both the South Dakota and Kentucky studies. In New Mexico grades 4-6 were established as the base program for costing purposes. The issue to be resolved relates more to the propensity of policy-makers, with regard to basic program definition, than to technical capabilities since it has been demonstrated above that researchers have performed studies in this area utilizing a variety of general education basic program designations.

The above eight programs (7 vocational and 1 basic) represent the second-level demension of a program structure. The first-level of the structure would be to divide the curriculum initially into vocational and basic program areas. The second-level may be designated as programs since those program designations meet the criteria established by Hale (1970) for program structuring. However, other designations of programs would also meet those criteria by simply reaggregating course offerings into meaningful groupings. The third level of the program structure may be each vocational course offering as the primary unit of analysis but address only total course groupings for the basic program. Since it was not an objective of this study to relate, for example, the cost of agriculture mechanics skills (course code 01.0305) to world history I, it was of little value to similarly dimension the basic program offerings into program elements for measurement purposes.

The program structure of this project may be conceptualized as in Table 2.1. The elements of the structure, all vocational course offerings, are the primary units of analysis.

TABLE 2.1

PROGRAM STRUCTURE

PROGRAM CATEGORIES (Level I)	
VOCATIONAL/TECHNICAL	BASIC
PROGRAMS (Level II)	
01--Agriculture 04--Distributive Education 07--Health Occupations 09--Home Economics 14--Office Occupations 16--Technical Education 17--Trades and Industry	T B A (e.g., Grades 7-12)
ELEMENTS (Level III)	
01--all course offerings, 04--all course offerings, ETC.	N/A

Cost Elements and Their Classifications

Financial data available will determine not only the accuracy and precision of the results of a study but also the comparability of costs among institutions Uniform procedures and terminology are therefore crucial in collecting and interpreting financial data. Variance among school districts, vocational-technical centers, and community colleges in their assignment of objects-of-expenditures to functions, for example, can result in overstatement or understatement of certain costs. Meaningful comparisons can only be made if there is agreement on procedures employed and definitions utilized. To provide a basis for uniformity in financial accounting the U.S.O.E. *Handbook II, Revised* was often utilized throughout research reviewed. That seminal document has been responsible for incorporating greater specificity into the accounting methods employed by most state education agencies. One of these states, Florida, as a result of impetus provided by U.S.O.E. and state legislation mandating cost data for legislative purposes, developed and implemented one of the more advanced state cost accounting handbooks. Handbook II, Revised, and the Florida guide are discussed briefly below. They highlight some of the issues which must be addressed in program cost studies.

Expenditure Classification Structures

Since the primary emphasis of cost-studies involved establishing and testing relationships of programs, cost objects, and/or cost functions, this discussion is intended to represent only an overview of the classification structure. A major work effort of this project was directd toward establishing definitive descriptions of each data element of the vocational-techical education added-cost model including functions and objects of the cost accounting dimension. The question of selections of expenditure elements for study was addressed earlier as being one of researcher-propensity in regard to data availability. Therefore, classifications utilized become extremely important.

Handbook II, Revised, identifies the purpose of providing classifications as "a basis for grouping the expenditures so that meaningful analysis can be made" (p. 22). Expenditures noted in that document, as well as esoteric state manuals, are categorized into dimensions. The dimensions include, among others, fund, object, function, operational unit, and program, with objectives and functions being the most often utilized among states.

Handbook II, Revised defines functions as "the activities or actions which are performed to accomplish the objectives of an enterprise" (p. 35). Five areas have been identified as functions--instruction, supporting services, community services, nonprogrammed charges, and debt service. Table 2.2 contains a partial breakdown of these functions into their subfunctions and

TABLE 2.2

SUMMARY OF EXPENDITURE ACCOUNTS RECOMMENDED BY HANDBOOK II, REVISED

Code	Function
1000	Instruction
1100	Regular Programs
1200	Special Programs
1300	Adult/Continuing Education Programs
2000	Supporting Services
2100	Support Services--Pupils
2110	Attendance and Social Work Services
2120	Guidance Services
2130	Health Services
2140	Psychological Services
2150	Speech Pathology and Audiology Services
2200	Support Services--Instructional Staff
2210	Improvement of Instruction Services
2220	Educational Media Services
2300	Support Services--General Administration
2310	Board of Education Services
2320	Executive Administration Services
2400	Support Services--School Administration
2500	Support Services--Business
2600	Support Services--Central
3000	Community Services
4000	Nonprogrammed Charges
4100 & 4200	Payments to Other Governmental Units
4300	Transfer of Funds
5000	Debt Services

Note: From *Financial Accounting: Classifications and Standard Terminology for Local and State School Systems* by U.S. Office of Education, Washington: U.S. Government Printing Office, 1973, p. 24-27.

service areas. To illustrate the various levels, the function designated as instruction can be divided into regular, special, and adult/continuing education programs. The area of regular can then be subdivided into elementary, middle, and high school programs with each being further divided into course areas.

Variation exists between Handbook II, Revised, and the manuals of states in designation of functions since some states still use the former Handbook II or state codifications. Four major areas are recommended in the Florida manual as opposed to five in Handbook II, Revised. The four designated areas are instruction, instructional support services, general support services, and community services, debt service, remittances, and transfers (see Table 2.3). The supporting services category (2000 series) of Handbook II, Revised, are divided into instructional (6000) and general (7000) support services in the Florida manual. Differentiation is thus provided between instructional support and operation of the schools (administrative activities). In bringing the number of functions to four, the areas of community services, nonprogrammed charges and debt service are subsumed under one heading. Similar differentiations were noted among other states reviewed.

The instruction function is comprised of the activities involved in the teaching of pupils (Handbook II, Revised; Florida manual, 1975). Restricitions are not placed on where and how the instruction is received. Any medium (such as radio or television) or assistance (such as aides or computers) involved in the direct teaching process is accounted for under this function. While the instruction function is utilized for direct activities, the support service function consists of indirect assistance which facilitates the teaching process. The Florida manual elaborates on support services by defining them

TABLE 2.3

SUMMARY OF EXPENDITURE ACCOUNTS RECOMMENDED BY FLORIDA MANUAL

Code	Function
5000	Instruction
5100	Basic (k-12)
5200	Exceptional
5300	Vocational-Technical
5400	Adult General
5500	Other Instruction
6000	Instructional Support Services
6100	Pupil Personnel Services
6200	Instructional Media Services
6300	Instruction and Curriculum Development Services
6400	Instructional Staff Training Services
7000	General Support Services
7100	Board of Education
7200	General Administration (Superintendent's Office)
7300	School Administration (Office of the Principal)
7400	Facilities Acquisition and Construction
7500	Fiscal Services
7600	Food Services
7700	Central Services (planning, research, evaluation, data processing)
7800	Pupil Transportation Services
7900	Operation of Plant
8100	Maintenance of Plant
9000	Community Services, Debt Service, Remittances, and Transfer of Funds

Note: From *Financial and Program Cost Accounting and Reporting for Florida Schools* by Florida Department of Education, Tallahassee: Author, 1975, pp. 4-18a through 4-25.

as "adjuncts for the fulfillment of the behavioral objectives of the instruction functions, rather than as entities within themselves" (p. 4-21). A few accounts located within this function are pupil personnel services, instructional media, instruction and curriculum development, and instructional staff training (Florida Manual, 1975, pp. 4,21,22). Handbook II, Revised, being more extensive in this function also includes, among others, support services involved in general administration, school administration, business activities, and operation of plant. These activities are included under general support services in the Florida Manual. The remaining functions reflect services to the community (no direct involvement in education of pupils), retirement of debt and interest on debt, payments to other governmental agencies, and transfer of money between funds.

An object of expenditure is "the service or commodity obtained as a result of a specific expenditure" (Handbook II, Revised, p. 30). Similar objects are identified by Handbook II, Revised, and the Florida Manual: (1) salaries, (2) employee benefits, (3) purchased services, (4) materials and supplies, (5) capital outlay, (6) other expenses, (7) transfers, and (8) replacement equipment and library books for existing libraries.* The major categories of these objects are summarized in Table 2.4 and provide a basis for meaningful analysis when related to programs or activities. Although all states use a system of identifying expenditures by objects, one may not expect all states to use the identifiers and codes given in Table 2.4.

The Association of Governing Boards of University and Colleges, the State Universities Association, the Association of State Universities and Land-

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*Replacement equipment and library books for existing libraries is designated as an object in the Florida Manual but included in capital outlay in Handbook II, Revised.

TABLE 2.4

SUMMARY OF OBJECTS OF EXPENDITURE RECOMMENDED BY HANDBOOK II, REVISED

Code	Object Categories and Subcategories
100	Salaries
200	Employee Benefits (Retirement, social security, group insurance, and other employee benefits)
300	Purchased Services
310	Professional and Technical Services
320	Property Services
330	Transportation Services
340	Communications
350	Advertising
360	Printing and Binding
370	Tuition
390	Other Purchased Services
400	Materials and Supplies
410	Supplies
420	Textbooks
430	Library Books
440	Periodicals
500	Capital Outlay
510	Land
520	Buildings
530	Improvements Other Than Buildings
540	Equipment
550	Vehicles
560	Library Books (new libraries)
600	Other Objects (Retirement of debt, payment of interest and so forth)
700	Transfers

Note: From *Financial Accounting: Classifications and Standard Terminology for Local and State School Systems* by U.S. Office of Education, Washington: U.S. Government Printing Office, 1973, pp. 30-35.

Grant Colleges, and the U.S. Office of Education united in a cooperative research project which resulted in the publication of Financial Analysis of Current Operations of Colleges and Universities (1966). The authors (Swanson, Arden and Still) classified expenditures as follows:

I. Instruction

    A. Organized teaching
    B. Academic counseling
    C. Operation of special instructional facilities: such as speech clinics, demonstration school, FARM, reading clinic, etc.
    D. Admissions
    E. Registration

II. Research

    A. Projects
    B. Faculty development
    C. Operation of special research facilities: such as research farms, nuclear reactors, etc.

III. Public Service

    A. Extension courses (noncredit)
    B. Other means of disseminating knowledge: such as television, consulting, agricultural extension, university press, etc.
    C. Regulation and inspection

IV. Services to the Academic Community

    A. Student development: counseling and testing centers, religious centers, vocational guidance, placement, etc.
    B. Student financial aids: employment, scholarships, grants, loans, etc.
    C. Care, subsistence, and recreation: housing, food service, union, health service, bookstores, parking, athletics, student organizations and activities, cultural activities, etc.

V. General Support

    A. Learning resources: library, museum, audiovisual aids, language labs, etc.
    B. Physical plant operations and maintenance
    C. Administration: governing board, administration, institutional studies, campus planning, etc.
    D. Promotion and development: alumni affairs, student recruitment, public relations.
    E. General institutional expense: institutional memberships, communications, insurance, interest, entertainment, etc.

Collard and Huff (1974) reported on the 1973 field testing of the National Center for Higher Education Management System (NCHEMS) preliminary Information Exchange Procedures (IEP) at seventy institutions. Using the program classification structure developed by Gulko for NCHEMS, institutional cost data were categorized, aggregated, and displayed according to activity centers. The activity centers fall into two categories: final cost objectives and support activity centers. The full costs of primary activities, categorized as final cost objectives, were determined by identifying the direct costs of all activity centers and allocating support activity center costs across the appropriate final cost objectives.

The full costs were determined for the following primary activities (final cost objectives):

(1) General Academic Instruction delineated by each institution into disciplines and course levels -- graduate, upper-level undergraduate, and lower-level undergraduate,

(2) Occupational and Vocational Instruction delineated as in (1) into disciplines and course levels,

(3) Special Session Instruction,

(4) Extension Instruction,

(5) Institutes and Research Centers,

(6) Individual or Project Research,

(7) Community Education,

(8) Community Service,

(9) Cooperative Extension Service,

(10) Teaching Hospitals,

(11) Intercollegiate Athletics,

(12) Student Support,

(13) Faculty and Staff Services, and
(14) Independent Operations.

The activity centers classified as support centers and whose costs were allocated to the primary activities follow:

(1) Libraries and Audio-Visual Services,
(2) Museums and Galleries,
(3) Instructional Computing Support,
(4) Ancillary Support (excluding hospitals)
(5) Academic Administration and Personnel Development,
(6) Course and Curriculum Development,
(7) Student Development,
(8) Supplementary Education Service,
(9) Counseling and Career Guidance,
(10) Financial Aid Administration,
(11) Executive Management,
(12) Fiscal Operations,
(13) Executive Management,
(14) Fiscal Operations,
(15) General Administrative Services
(16) Physical Plant Operations, and
(17) Community Relations.

Capital outlay costs for equipment and facilities were excluded in this preliminary field test. It was indicated that the full costs of primary activities should include capital outlay consumption, and that it would be included in the final form of the cost study procedures.

In the Johnson and Huff (1975) final version of IEP Cost Study Procedure, the treatment of capital costs was included. Capital costs were defined as a valuation placed on services provided by land, buildings, and equipment owned or rented and used by the institution. Calculated costs consisted of rental charges for rented capital assets and depreciation charges for owned capital assets. Capital cost for buildings and land improvements consisted of (a) the current year expenditures for rentals and leases related to buildings and land improvements, and (b) a depreciation charge calculated as two percent of the total original cost of all owned buildings and land improvements. Capital cost of equipment was determined by adding the current year rental and lease expenditures for equipment to the amount calculated by multiplying 10 percent times the total original capital equipment cost for the last 10 years.

The parameters recommended for use in allocating each of the support center's costs to the primary activities are shown in Table 2.5. Some of the important definitions and procedures used in the study are:

1. Cost data were calculated from operating account expenditures for one fiscal year (in most cases, 1972-73). The unit costs of instructional disciplines and programs, however, included expenditures for only the normal academic year of the institution, that is, usually nine months.

2. Unit costing was completed for courses in all disciplines, at all levels; lower division, upper division, and graduate were based on credit hours attempted as of the institution's regular recording date(s) of each term.

3. Unit costing for degree and certificate programs was based upon full-time equivalent (FTE) students. The annualized FTE student was defined in degree programs as 30 semester credits at undergraduate levels, or 24 semester credits at graduate levels. Discipline credits and their unit costs

were crosswalked to programs by means of an instructional workload matrix (IWLM). Program costs per FTE student major were calculated at four levels:

(a) lower division,
(b) upper division,
(c) graduate I (master's level), and
(d) graduate II (doctoral level).

4. Direct costs included:

(a) compensation (salaries, wages, and benefits),
(b) supplies and services,
(c) equipment expenditures from operating funds, and
(d) first level administration costs (department chairman).

5. To distribute faculty salaries among the disciplines and to levels of instruction within disciplines, an assignment analysis was completed for each individual faculty member. Compensation paid to each individual was distributed in proportion to his/her teaching assignments.

6. For each discipline, the direct costs other than faculty salaries were allocated to each course level on the basis of the faculty salary distribution determined in the assignment analysis.

7. Full unit costs for disciplines and instructional programs were calculated by allocating support costs such as expenditures for libraries, executive management, physical plant maintenance, and so forth across the activity centers designated as final cost objectives. The parameters used to allocate the support costs were direct costs, semester credits, and/or FTE professionals.
The specific allocation parameters used for each support activity center are shown in Table 2.5.

The Costing Standards Committee of the National Association of College and University Business Officers (NACUBO) (1976) evaluated the Cost Analysis Manual (CAM) and the cost study procedures part of the Information Exchange

TABLE 2.5

ALLOCATION PARAMETERS AND FINAL COST OBJECTIVES RECEIVING SUPPORT COSTS

Support Activity Center Name	Recommended Allocation Parameter*	Final Cost Objectives Receiving Support Costs
Course and Curriculum Development	FTE Professionals	1. General Academic Instruction
Student Development	Semester Credits	2. Occupational and Vocational Instruction
Supplemental Educational Service	Semester Credits	3. Special Session Instruction
Counseling and Career Guidance	Semester Credits	4. Extension Instruction
Financial Aid (Administration)	Semester Credits	
Libraries and Audio-Visual Services	50% on FTE Professionals	1. General Academic Instruction
	50% on Semester Credits	2. Occupational and Vocational Instruction
Museums and Galleries	Direct Costs	3. Special Session Instruction
Computing Support	Direct Costs (if actual usage data are not available)	4. Extension Instruction
		5. Institutes and Research Centers
Ancillary Support (by HEGIS discipline category)	Direct Costs	6. Individual or Project Research
		7. Community Education
Academic Administration and Personnel Development	Direct Costs	8. Community Service
		9. Cooperative Extension Service
Community Relations	Direct Costs	
Executive Management	Direct Costs	All Final Cost Objectives**
Fiscal Operations	Direct Costs	All Final Cost Objectives**
General Administrative Services	Direct Costs	All Final Cost Objectives**
Logistical Services	Direct Costs	All Final Cost Objectives**
Physical Plant Operations	Direct Costs	All Final Cost Objectives**

*Actual use data are preferred.
**Except independent operations.

Procedures Manual (IEP) by NCHEMS. Their conclusions were that in comparison with other methods designed for higher education the NCHEMS products were fairly simple and particularly adaptable to smaller, single-purpose institutions. NACUBO stated that additional research is needed in critical areas remaining unresolved. These were (a) uses of cost information, (b) fixed, variable, and semivariable costs, (c) cost identification and assignment, (d) modifications of cost analysis manual (CAM) and information exchange procedures (IEP), costing systems, and (e) direct and indirect costs.

In summary, the primary expenditure components selected in these cost analyses involved current operating expenses with transportation, food service, debt service, and capital outlay excluded in most cases. In computing cost per pupil, the Institute for Educational Finance and the Johnson and Huff studies were the only ones noted which tried to capture a depreciation or equipment replacement amount. Since the basic determinant in selecting expenditure components emanates from the purpose of the study, it was incumbent upon those researchers to do so. McLure (1975), in calculating per pupil instructional costs, omitted all public service and capital outlay costs because he noted that they were only indirectly related to instruction. The Institute for Educational Finance study, however, included a wider range of expenditure categories in order to determine the total program and course cost for vocational education. All expenditures included in the funding categories of the Florida Educational Finance Act of 1973 were included; transportation and food service were thus excluded, recognizing the special purposes of the researchers.

Cost Finding and Cost Analysis Procedures and Issues

An analysis of program costs or instructional costs necessitates the identification of expenditure components which accurately reflect the inputs required to support a particular program or activity. These expenditures often involve several programs as well as indirect costs which must be prorated among programs or areas. Varied expenditure components and methods of proration have been employed in computing program costs. This section of the literature review focuses on procedures employed to arrive at program costs in selected cost analysis studies.

A Major Issue: What Constitutes Direct and Indirect Costs?

According to the definitions provided in this review a direct cost is an element of cost or expenditure which can be obviously, easily, and conveniently identified with specific activities or programs. Accordingly, Young, (1964) defined direct cost as those outlays necessary to conduct programs, such as expenditures for instruction and for training materials. He considered the initial purchase of equipment to "tool up" a program as a development cost instead of an operational cost. Lindman (1972) included among direct costs those expenditures that relate to specific instructional service in an instructional program, excluding expenditures for capital outlay and debt service.

In contrast, Galloway and Ghazalak (1972) included current capital expenditures as direct cost. Peat, Marwich and Mitchell (1971) extended the term even further, including any expenditures which could be directly identified with a particular course, such as teachers' salaries, instructional equipment, building operation, and maintenance.

In general, indirect costsare those remaining elements of expenditure which cannot be readily or accurately traced or identified with a specific service, program, or unit of output. Backer and Jacobson (1963) gave the term the denotation of a cost "which is not traceable directly to the business segments", and therefore must be apportioned to processes, jobs, and/or possibly on the basis of time or use factors. Young's conceptualization of indirect costs included those expenditures which provide a capability to carry on effective training, such as teacher training and administration. Lindman included in indirect cost those current expenditures for operational overhead, administration, and support activities of the program, school, and/or district. However, the major issue with indirect costs is not as much a matter of what is included but methods of apportionment of cost. This will be dealt with in the review of cost finding and cost analysis procedures in selected cost studies.

Cost Finding

Rossmiller, Hale and Frohreich (1970) utilizing 24 school districts nationwide conducted the first comprehensive cost analysis study comparing the costs of exceptional child programs to regular programs. Six broad expenditure categories were used to determine the current operation cost:

(1) Management
(administration and clerical and secretarial)
(2) Instruction
(teachers and teacher aides)
(3) Instructional Support
(supplies and equipment, guidance and counseling and other)
(4) Institutional Operations
(operation and maintenance, fringe benefits, and other)
(5) Services
(health and food)
(6) Transportation
(cost per pupil in average daily membership)

In allocating indirect costs, the assumption was made that the cost per pupil in regular and exceptional programs was the same unless additional expenditures were reported for the special programs. Rather than prorate operation and maintenance on a per pupil basis, a method was derived based on amount of space provided per pupil. To arrive at the per pupil cost for operation and maintenance the total enrollment of the school district was divided into the total cost reported for operation and maintenance. Thirty square feet wereallocated to each pupil in the regular program. In order to determine the pupil cost in special programs, the number of square feet occupied by pupils in those programs was divided by 30 to arrive at an index. This index was then multiplied by the per pupil cost computed above.

In addition to calculating the current operation cost, costs of transportation per pupil transported, capital outlay per ADM, and debt service per ADM were reported. These costs, however, were not included in the per pupil cost figures for the various programs but were reported as accounting memoranda.

The Rossmiller et al. methodology was adopted or adapted in many later studies. Among these studies were Rossmiller and Moran's studies in Kentucky (1973) and South Dakota (1973), Singletary's study in Florida (1973), and Clemmon's study in Minnesota (1974).

McLure (1973) analyzed the costs of educational programs in the elementary and secondary schools of Florida. This analysis was limited to current operating expenditures; transportation, food service, capital outlay, and textbooks were not included. Account records in Florida were not maintained on a program basis at the time this study was done. In order to prorate costs, expenditures were divided into four groups: salaries of teachers, salaries of aides, salaries of nonteaching professional supportive staff, and nonsalary expenses. The nonsalary expenses were prorated on a per teacher basis.

The Texas Education Agency (1975) conducted a study to determine cost differences in all educational programs for a sample of 41 school districts in that state. The data collected were organized into the following cost categories:

(1) General Administration Payroll Costs
(2) Campus Administration Payroll Costs
(3) Counseling Service Payroll Costs
(4) Library Administration Payroll Costs
(5) Instructional Administration Payroll Costs
(6) Instructional Payroll Costs
(7) Attendance Service Payroll Costs
(8) Health Service Payroll Costs
(9) Other Administrative Costs
(10) Other Instructional Costs
(11) Other Maintenance and Operational Costs

Costs excluded from the study were transportation, food service, community service, student body activities, debt service and capital outlay. The study was further delimited to include only costs paid from state and local funds and data collectible from state level sources.

After the data were collected, an effort was made, using state records, to identify expenditures which could be directly attributed to selected programs or to general programs. In most cases the direct expenditures were from salaries. Direct costs which could not be charged to a selected program were prorated to a general program area, i.e., vocational education, on the basis of FTE teachers or FTE students.

Indirect costs were determined by subtracting direct costs to individual programs and general programs from the total cost determined for the cost category, e.g., general administration payroll costs, instructional payroll costs and so forth. The costs remaining were prorated on an FTE student basis except for the categories of general administration payroll costs, campus administration payroll costs, and instructional administration payroll costs which were distributed on an FTE teacher basis.

The Institute for Educational Finance, University of Florida, conducted a study (1975) in which vocational education and adult education course costs were determined for 24 Florida school districts for fiscal year 1973-74. The analysis of expenditures was limited to current operating expenditures and capital outlay with transprotation and food service excluded. Financial data were obtained from the following expenditure accounts:

(1) Administration
    (system wide)
(2) Instruction
    (salaries of teachers, principals, and support personnel; textbooks; supplies; library books; contracted services; and other instructional expenses)
(3) Operation of Plant
(4) Auxiliary Services
    (attendance and health)
(5) Fixed Charges
    (insurance, employee retirement, and others)
(6) Community Services and Non-program Schools
(7) Capital Outlay

Salaries were the only expenditures identified as a direct cost and allocated on a program or course FTE pupil basis. If salaries could not be identified or allocated directly to a program or course they were prorated, along with all other expenditures in the above list, on the basis of total FTE pupils in the district.

An effort was made to recognize capital outlay in that study. Costs were computed both with and without an equipment replacement cost per FTE pupil. The depreciation amounts used had been determined by the Florida Division of Vocational, Technical and Adult Education by (1) determining cost of equipment needed in courses and dividing by estimated useful life and (2) dividing this annual depreciation amount by average number of FTE pupils per facility.

The Institute for Educational Finance conducted an earlier cost study (1974) in which program costs were determined for 26 program categories in Florida for the 1972-73 school year. The cost components utilized were similar to the later vocational study. However, in this study the allocation procedures differed for a few of the components since costs for administration, counsultants and supervisors, and principals were allocated on an FTE teacher basis rather than FTE student. There was no attempt made to include depreciation costs as was done in the later study.

Program Accounting and Indirect Costs

Program accounting in education is of recent vintage and its popularity seems to have risen with the popularization of Planning-Programming-Budgeting Systems (PPBS). Aside from PPBS and other integrative notions on management, a major substantive work on program cost accounting has been done by U.S.O.E. through Handbook II, Revised, the National Center for Higher Education Management Systems (NCHEMS) and through the National Education Finance Project (NEFP) and the subsequent state studies performed by NEFP consultants. Program accounting, under any rubric, requires that all activities of the school district or postsecondary institution be classified according to some taxonomy. The identified taxonomy become the programs to which expenditures are associated. The latter is often called a program structure, and the programs identified generally represent the esoteric propensity of their author. However, the program designations do affect the complexity of the program accounting tasks. For example, to cost account for First Grade is substantially less complex than cost accounting First Grade Activities (e.g., reading, arithmetic, penmanship, group manners, etc.). A similar example would be program accounting for Vocational Education as opposed to each of the vocational education areas (e.g., agriculture, business education, trades and industry, etc.) and then cost-accounting courses. The complexity associated with the latter example relates primarily to pupil accounting on a full time equivalance basis (FTE) and the substantial task of prorating numerous expenditure elements to each of the courses.

During 1967, the School Budget Research Committee of California conducted a comprehensive national survey of school districts who claimed to (1) have implemented program budgeting, (2) have partially implemented program budgeting, and (3) have plans for implementing program budgeting (Hill, 1967). The findings of that survey showed approximately 65 percent of the respondents included only direct costs in their program accounting but approximately 40 percent reported that they prorate indirect costs for claim purposes on funded programs and not for other programs. The methods of prorating costs included: time, time-floor area, hour consumption, number of pupils, among others.

The above findings are not particularly informative since the program structures were not associated with the need for prorating expenditures and the program structure, as noted above, will determine what costs must be prorated. For example, if one takes the position of Hale (1970), that general administration is a program with goals and objectives, then there is little efficacy in prorating expenditures for administrative services to other programs. However, that type of program structure is not popular, even among those who do program accounting. Rossmiller and Moran (1973) noted that school districts did not maintain accounting records based on educational program structures; a fact that requires object-related current expenditures be allocated to program in some less desirable manner, often depending upon the availability of supporting data and the level of accuracy required. Finally, in his discussion on setting objectives, Drucker (1954) noted that the measurement used determines what one pays attention to, it makes cost elements visable and tangible or it puts them out of sight and out of mind.

In contrasting direct versus indirect costs, Lindman reported (1968, p. 17) "administrative" costs were accounted as 10 percent direct, 90 percent indirect. Ten percent of the "instruction" costs were reported as indirect while 100 percent of "operation of plant" and "fixed charges" were reported as indirect costs and 90 percent of "maintenance of plant" was so reported. Thus, it can be readily seen that the program structure and the level of accuracy one requires make a substantial difference in the what-and-how-and-which costs are associated with a particular set of programs. However, use of Lindman's report beyond rule-of-thumb estimates would seem to have little value.

Methods of Allocation of Indirect Costs

Although indirect costs may not be specifically identified with a program or activity, these costs can be reflected through a method of proration. Ten bases for allocating costs are listed in Handbook II, Revised,: (1) time, (2) average daily membership or pupils enrolled, (3) time/space, (4) time/consumption, (5) number of pupils, (6) mileage, (7) units consumed, (8) employees, (9) number of transaction, and (10) dollars. As a practical example, one state lists three bases for prorating costs: (1) FTE student, (2) staff, and (3) time and space. Table 2.6 illustrates an application of that method. The basic criterion which should be used in selecting a method of proration is that there be a relationship between the method and the activity to which costs are being allocated (Handbook II-B, 1967). However, another consideration is that the method selected does not involve prohibitive application costs relative to the precision achieved.

TABLE 2.6

EXAMPLE OF BASES FOR PRORATION OF SELECTED INDIRECT COSTS

Support Education	FTE	Instructional Staff	Time and Space
Pupil Personnel Services (guidance, health service, etc.)	X		
Instructional Media Services	X		
Instruction and Curriculum Development		X	
Instructional Staff Training Services		X	
Board of Education	X		
General Administration		X	
School Administration		X	
Operation of Plant			X
Maintenance of Plant			X
Capital Outlay	X		
Fiscal and Central Services		X	
Food	X		
Transportation	X		

Several methods of allocating indirect costs noted above were taken from the CAPSBO survey. More specifically, those methods and others are included in the following and are presented here as exemplars only:

F.T.E. Student--allocate all indirect costs as a percentage of the number of full time equivalent students in the program. For example, if the number of FTE students in all programs is 1,000 and the FTE students in the Agriculture program is 25, then 2.50 percent of all indirect expenditures are charged to the Agriculture program.

F.T.E. Teacher--allocate all indirect costs as a percentage of the number of full time equivalent teachers in the program. For example, if the number of FTE teachers for all programs is 40 and the FTE teachers in the Agriculture program is 1.0, then 2.50 percent of all indirect expenditures are charged to the Agriculture program.

Hour Consumption--allocate all indirect costs as a percentage of the number of student hours consumed in a particular program. Although this method is essentially the same as the FTE student method, it may be computed as a percentage of program-hours consumption. The method requires that all programs be weighted by class-hours taught per week (month/year), then each program's class hours be so related. For example, if all programs consume 1,000 class hours per week and the Agriculture program consumes 22 classes per week, then 2.20 percent of all indirect expenditures are charged to the Agriculture program.

Space Consumed--space utilization by program is normally only associated with prorating operation and maintenance of plant expenditures. The method of prorating is straight forward--calculate the total program floor space in all plants. Express each program's floor space as a percentage of the total program space, then use that percentage to allocate all expenditures required for operation and maintenance of plant (and grounds). For example, if the total program space is 30,000 square feet and the Agriculture program space is 1,000 square feet, then 3 1/3 percent of all operation and maintenance of plant expenditures are charged to the Agriculture program.

Again, depending upon the program structure, one may desire to associate expenditures for transporting students to and from school with each program. However, unless special high-cost transportation is required, as in the case of exceptional children, it seems more appropriate to charge transportation expenditures to all programs on an FTE student basis. The rationale for this procedure is that no program creates an unusual transprotation need. Then all programs should equally share the cost of transportation; the same rationale would be serviceable for prorating Attendance and Health Services, excess costs of Food Services, and The Student Activity Program if those services were not part of the program structure.

Allocation of Costs for Space Use--Current expenditures required for the operation and maintenance of plant and grounds include such objects as custodian salaries, supplies, utilities, and so forth. The method recommended by U.S.O.E. for prorating these expenditures to instructional programs was modified somewhat and presented in the previous section as "space consumed." As noted above, the literature is in agreement on this method of prorating current expenses.

The literature does not recommend that depreciation allowance for buildings be assigned as operational costs of programs (Tidwell, 1960, p. 185) (Thomas included depreciation as an economic cost). However, in memorandum accounting, Roberts and Lichtenberger (1973,pp. 88-89) suggested that "building use costs" might appropriately include building depreciation. Tidwell (1960, pp. 191-192) recommended that a schedule of changes in general fixed assets be offered as part of the year- end report but that depreciation of buildings is not appropriate for public school accounting.

The recommendation to utilize the "space consumed" method for prorating current expenses and the recommendation not to include building depreciation would seem to be sound practices for descriptive program cost accounting.

Capital Outlay and Equipment Costs: A Special Problem

How should capital investment expenditures be treated? By definition capital items such as equipment, fixtures, and buildings are not consumed during the time period in which they are purchased. This fact makes them different from other cost elements.

An equipment item is a material which meets all of the following conditions (Roberts and Lichtenberger, 1973, p. 108):

1. It maintains its original shape and appearance with use.
2. It is nonexpendable, that is, if the article is damaged or some of its parts are lost or worn out, it is usually more feasible to repair it rather than replace it with an entirely new unit (which is not true of supplies).
3. It represents an investment of money which makes it feasible and advisable to capitalize the item.
4. It does not loose its identity through incorporation into a different or more complex unit or substance.

As noted above, Roberts and Lichtenberger recommended that depreciation of equipment be exercised only in memorandum accounting, an informal record, which is consistant with Tidwell. Similarly, Lindman rejected depreciation of equipment and suggested that it be charged to the program at the time of purchase. However, the latter recommendation creates a problem for cost accounting programs to determine relative operational costs. It should be obvious that equipment purchases in a given year will overstate the operational cost of that particular program. It is equally obvious that equipment costs for some programs are rather substantial and the program would suffer qualitatively or not exist without the equipment. The dilemma then is, does one account for equipment expense through depreciation or does one recognize equipment costs in the year purchased and thereby over-state program costs? Neither alternative seems to satisfy the general purposes of cost accounting.

Young (1964) considered the initial purchase of equipment to "tool up" a program as a development cost instead of an operational cost. He also recognized that to determine equipment cost per pupil trained would require amortization of each piece of equipment over its anticipated lifespan, plus a determination of the annual pupil use of each type of equipment. He did not include equipment in his 1964 study. Corazzini (1966) also chose not to include the annual expenditures for equipment and facilities, stating that this choice was made to avoid wide variations in per pupil costs. Likewise, Lindman chose to exclude expenditures for capital outlay and debt service from direct cost categories in his 1972 study.

However, Peat, Marwich, and Mitchell (1971) included instructional equipment and building costs among direct costs if they could be directly identified with a particular course. They used a straight-line depreciation method to allocate capital expenditures on buildings and other equipment, giving a building of concrete construction an expected life of 30 years, and one of wood construction 10 years (Gasior, 1975, p. 53). Conversely, Ittner (1972) included depreciation on buildings, storage, and equipment among indirect costs.

It has previously been noted that Flynn's resource approach to cost analysis designates two kinds of unit cost: operating and capital, with capital costs being investments. Flynn stated that capital purchases are often made with borrowed money which must be paid back over time, with interest, and therefore capital costs should be amortized over the useful life of the investment by systematic consideration of both interest and useful capital item life.

The National Education Finance Project recommended that states should share the responsibility for capital outlay expense with the local school district and postsecondary institutions (if locally supported) and offered several models for implementing their recommendation. Assuming the state does share capital outlay expense for buildings and equipment, then it can be argued that the state should not again pay for the equipment by including such expenses in the program cost index or other program funding calculations. For example, if the state shares 50 percent of the local district s capital budget (100 percent in Maryland) then vocational equipment purchased should not again be charged the state by including a depreciation allowance for vocational equipment in the cost index. However, as educational agencies rely more on state assistance for total program costs then it is imperative that the state adequately share capital expenses. Vocational education programs in particular have capital expenses for equipment well beyond other programs and these expenses must often be met prior to operating the program.

Depreciation is defined as the "loss in value or service life of fixed assets because of wear and tear through use, elapse of time, inadequacy, or obsolescence" (Handbock II, Revised, p. 124). Until the past few years, accounting for depreciation was only a concern of the private sector. A U.S. Office of Education publication of 1967, Principles of Public School Accounting, reflected the general view of depreciation in the following statement: "In school accounting, profit and loss have little significance, and therefore recording depreciation of fixed assets is of little importance" (p. 220).

Although in practice the situation has not been altered, there is now a recognition of the need and importance of depreciation accounting in public education. This has been brought about in part by interest in determining program costs and the allocating of capital-outlay as an indirect cost.

In cost studies of programs for exceptional children, higher cost indices reported in those studies are attributed to several factors, one of which is equipment. Bentley (1970) found that equipment was one of the most significant factors in contributing to cost differentials. It, therefore, becomes necessary to consider more than current expenditures in calculating costs of programs. However, when capital-outlay is considered, decisions must be made pertaining to the accounting for these costs as one-time charges or a depreciation charge against current operations.

Reporting the total cost of equipment to a program in the year in which it is required causes the program costs to vacillate with costs overstated in the year of acquisition and understated in succeeding years. Advocates of depreciation accounting emphasize that this can be alleviated by employing a depreciation schedule to indicate "use" cost each year. The inclusion of depreciation in the accounting system of public schools has been supported by the General Institute of Certified Public Accountants (1974). Another supporter of recognizing depreciation has been the U.S. Office of Education. Handbook II, Revised, identified "operating costs" as direct cost, indirect cost, and use cost of buildings and equipment. The "use cost" or depreciation is maintained as memorandum accounting and the recommendation is to charge depreciation as program costs each year rather than the initial cost in the year of acquisition.

Alternatives to actual depreciation can be adopted to arrive at approximations of depreciation costs. The Division of Vocational, Technical and Adult Education in the Florida Department of Education utilizes an equipment replacement cost per FTE student in arriving at program costs. The replacement cost was calculated by determining the equipment needed in each course and then estimating the useful life of each item. After an annual replacement value was determined by the straight-line method of depreciation, the average pupil FTE per facility was divided into this figure to yield the replacement cost of equipment per FTE student. The Institute for Educational Finance, in a study of costs of vocational and adult education programs in Florida, employed the equipment replacement cost technique. Cost per FTE student was calculated both with and without depreciation in six vocational categories. The differences between cost per FTE student with and without depreciation cost are shown in Table 2.7.

TABLE 2.7

COST PER FTE STUDENT FOR VOCATIONAL PROGRAMS
IN FLORIDA FOR 1973-74[a]

Program	Without Depreciation	With Depreciation	Percentage Increase w/Depreciation
Vocational Education I	$1,256.05	$2,461.48	96
Vocational Education II	1,149.19	1,539.04	34
Vocational Education III	1,091.21	1,539.07	41
Vocational Education IV	975.71	1,221.06	25
Vocational Education V	950.81	1,011.81	6
Vocational Education VI	900.40	914.68	2

[a] Unweighted Mean Cost per FTE

Note: From Cost of Vocational and Adult Education Programs in Florida by Institute for Educational Finance, Gainesville, Florida: Author, 1975 pp. 167-181.

Although there are many proponents for using depreciation in arriving at program costs, the time consuming task of record keeping has resulted in it largely being ignored by school systems. According to Frohreich (1975) most school systems report equipment each year under the heading of capital outlay which is then prorated to all programs as an indirect cost.

It would seem to be appropriate to recommend that equipment depreciation expense not be included as an operational expense in descriptive program cost accounting. However, the auditor should attach a memorandum identifying the total yearly depreciation experience (generated on a straight-line method for the expected life of each item). This recommendation would be consistent with Handbook II, Revised, and with Tidwell.

Cost Finding Techniques

A key to successful cost finding, allocation, and comparison is the development and use of techniques which enable accurate and practical capturing of costs and the allocation of those costs to appropriate centers. The following section deals with issues relating to such techniques and reviews the techniques used in a number of studies.

Direct cost is defined in Backer and Jacobson (1964) as a cost that can be directly identifiable with a process, product, job or other business segment.

Indirect cost is defined by them as a cost "which is not traceable directly to these business segments," and, therefore, must be apportioned to processes, jobs, and/or possibly on the bases of time or use factors.

Swanson (1968) directed a study which included determination of unit costs of vocational education. His student measure data element was student contact hours per week. The cost elements were:

(1) direct classroom expense and includes teacher salaries and fringe benefits
(2) quasi-instructional services such as supervision, leaves, and study hall aides
(3) nonteaching services which include the school administrators and clerks, curriculum development, guidance, library, and audiovisuals, student activities, director, community relations and building and grounds
(4) school district central services which include general administration, business services, general supervision and curriculum development (fixed assets and capital outlay are not included in this analysis)
(5) abatements assumed by negative costs due to services and products sold by students. (p. 19)

Harris' (1975) analysis of vocational-technical center expenditures included these cost allocation elements:

1. An amount from expenditures for system-wide administration;
2. An amount from the expenditures made for the county-wide administration and supervision of vocational, technical and adult education;
3. An amount expended for current operations for instruction in the vocational-technical programs provided in the center including:
    a. Salaries for certified personnel,
    b. Salaries for noncertified personnel,
    c. Free textbooks,
    d. Library services,
    e. Instructional supplies,
    f. Other expenses for instructors, and
    g. Contracted services for instruction;
4. An amount expended for the operation of the physical plant (or an amount allocated from district-wide expenditures for plant operations);
5. An amount expended for maintenance of the physical plant (or an amount allocated from district-wide expenditures for plant maintenance);
6. An amount expended for auxiliary services, including transportation;
7. An amount for district-wide fixed charge expenditures;
8. Charges for depreciation of movable equipment calculated at one tenth of the original value of the equipment;

9. An amount expended for current operations from internal accounts (from nontax sources);

10. Current operating and capital costs incurred either directly or indirectly by the public sector (federal, state and local governmental agencies) representing the public costs of vocational education programs; and

11. Indirect cost representing the opportunity cost of foregone benefits which students could have realized if they had been employed in the labor market rather than attending vocational training.

Deuker and Altman (1967), reporting on the operation of vocational education programs, selected cost factors from the Financial Accounting Handbook (1957). These were expenditures for:

> (a) Attendance services, (b) health services, (c) pupil transportation services, (d) operation of plant, (e) fixed charges, (f) food services, (g) student body activities, (h) salaries for instruction, (i) textbooks, (j) library, (k) audio-visual materials, (l) teaching supplies, (m) other expenses for instruction, (n) plant maintenance, and (o) capital outlay. (pp. 19-22)

Cage (1968) analyzed costs of course offerings in Iowa's area schools. Deciding that the uniqueness of courses and programs dictated calculation of current student cost per contact hour, he concluded that this uniqueness made computed costs more useful within a program (for budget analysis and cost projections rather than for cost comparisions among programs).

Cage did not include initial investments in equipment or facilities in his cost calculations, nor did he use cost factors derived from depreciation of these capital investments. Only the expenditures for repair and replacement of equipment were included as current cost. Cage classified the direct costs of a program into five areas.

> (1) instructional services, (2) fixed charges, (3) maintenance and repair of equipment, (4) minor equipment and remodeling, and (5) other operating expenses.

Indirect costs were prorated among vocational-technical programs and those of the arts and sciences. The indirect costs included:

> (1) salaries of administrators, (2) board of directors, (3) superintendent's office, and (4) operation and maintenance of local campus.

His selection of cost factors is evident in relationship to delineation of direct and indirect costs.

Cage allocated indirect costs on a basis of full-time equivalent enrollment ratios. The direct cost and prorated indirect cost were summed to yield total program cost. The program cost divided by the total student-contact hours in the program yielded cost per student-contact hour (p. 41-42).

The cost factors used in Wells' (1966) study were certified salaries, nonteaching services expense, noncertificated salaries, supplies expense, equipment, operation and maintenance of plant expenses, and tuition payments to outside districts. That study prorated department expenses equally among all classes taught by a department when individual class (course) expenses could not be precisely determined. The total weekly student-contact hours unit was used to establish unit costs (pp. 16-17, 83).

The difficulties encountered in identifying and allocating indirect costs are demonstrated by the general lack of agreement exhibited in the several studies. Condie's (1969) attempt to develop a model for reporting costs supports this position. Upon reviewing several methods for allocating indirect costs, he concluded:

> It should be emphasized again that no allocation method produces completely accurate results because there is no completely accurate method for allocating indirect expenses. (p. 68)

Anderson (1966) used cost factors as follows: administrative salaries, teachers' salaries, supportive instructional expenses, operation and maintenance of plant expense, auxiliary services expense, fixed charges, and "other." His study techniques used all expenditures except original capital outlay and equipment. Teachers' salaries were apportioned to courses they actually taught by dividing each salary by the credit hours taught by each teacher. Indirect costs not allocated to departments by an institution were apportioned to the departments on the basis of the ratio of the department's total direct cost salaries to the institution's total direct cost salaries.

Fowler (1970) also calculated unit costs on a credit hour basis. Total department, division, and institution-wide expenses were apportioned to courses taught. His study was designed to determine the ratio of the unit costs of vocational programs to the average cost of the regular, college-transfer program.

Parry's (1968) cost factors for accounting for indirect costs were administration, student personnel services, equipment maintenance, fixed charges, auxiliary services, and plant operation and maintenance. All indirect cost elements except plant operation and maintenance were prorated on a basis of the number of membership hours of instruction. A combined basis of square footage of space used and student membership hours was used to prorate plant costs.

Dunaway's (1969) study developed cost indices for community college programs offered in a select group of colleges. He chose the full-time staff member as the statistic to be used to allocate professional staff support costs at the instructional department level and for the general administration expenses budget category. Each course was assigned all direct costs first. Departmental, professional-support-staff salaries were prorated to a course based on the percentage of teachers in the department that taught the course;

i.e., FTE teachers of a course divided by department total FTE teachers times professional support staff salaries. College-wide general administrative expenses were prorated to departments based on the percentage of professional FTE staff in a department, i.e., FTE professional staff in a department divided by college-wide total FTE professional staff times total general administrative expense. Based on the selected statistic, student-credit hours, Dunaway apportioned remaining operations expenses to these identified cost factors: instructional supplies, nonprofessional salaries, expendable equipment, operation of plant, and "other" instructional costs.

Vance (1974, pp. 23-24) stated that "instruction is the productive function of the educational system and, therefore, all operating expenditures should be assigned to and/or distributed to that function," using quoted support from Lasser (1956, pp. 4-17), Grady (1965, p. 157), and Backer and Jacobson, (1963, pp. 8-9). He indicated that Zanfino (1968, pp. 57-63) was in general agreement with this position and believed indirect costs could justifiably be allocated on a formula basis to instruction. Zanfino believed it would be most difficult to charge items such as maintenance and administration costs to the specific departments where they were incurred.

Some authorities opposed the concept that all costs should be assigned or distributed to the process or product of instruction. As Bierman (1963, pp. 50-52) pointed out, some believed that only costs which vary with quality may be associated with the product. Some believed that certain fixed costs exist in any case and should not be included as a part of product cost (Vance, 1974, p. 24).

Vance designed his study of community colleges and technical institutes in Alabama to take into account the concept of fixed costs. Rather than distributing all costs to the product, instruction, the following identified cost centers were treated as entities: administration, instruction, learning resources, student services, transportation, and operation and maintenance of plant. One of his key objectives was to show the contribution each of these functions made to total cost.

Sorenson's (1972) study used the following data elements:

1. Current cost of administration of vocational education programs,
2. Current cost of supervision of vocational education programs,
3. Current cost of vocational instructors' salaries,
4. Current cost of classified staff's salaries,
5. Current cost of instructional supplies,
6. Total current cost of vocational education programs,
7. Annual average daily attendance generated by students in vocational programs,
8. Annual current cost per average daily attendance in vocational programs, and
9. Average weekly student contact hours per instructor in vocational programs.

Ittner's (1972) cost variables were categorized first by direct cost vs. indirect cost classifications, and secondly according to the locus of cost occurrence: institutional, learners', or community. His comprehensive cost element structure was:

INSTITUTION

Direct Cost

Teachers' Salaries
Supplies
Equipment
Classroom Space
Lab Space
Lab Assistants' Salaries
Tool Room Keepers' Salaries
Instructional Materials
Fringe Benefits
Leasing Expenses

Indirect Cost

Administration
Custodial Services
Maintenance Services
Counseling Services
Depreciation On
  A. Buildings
  B. Storage
  C. Equipment

LEARNER

Direct Cost

Books
Tools
Materials
Lost Wages
Transportation

Indirect Cost

Study Time
Failure-repeat Time

COMMUNITY

Direct Cost

Taxes - School Overrides
Bonds - School

Indirect Cost

Competition in Job Market
Change in Welfare
Change in Costs of Penal Institutions

In Galloway and Ghanzalak's (1972) study, data elements were identified for collection and analysis from the following sources.

1. A financial statement of expenditures for the budget year, 1970-71;
2. An itemized statement of the value of the school's physical property (land, buildings and improvements, and equipment), with data of acquisition;
3. The total number of pupils in the school;
4. The total number of vocational pupils in the school;
5. The total number of academic pupils in the school;
6. The number of trainees and graduates in each vocational program;
7. The number of vocational instructors in each program; and
8. The total number of vocational and academic instructors in each school.

Peat, Marwich, Mitchell and Co. (1971) conducted a cost effectiveness study of the vocational education programs in Puerto Rico. Cost elements used in that study were the traditional objects-of-expenditure:

1. Salaries
2. Administration
3. Books and materials

4. Building and improvements
5. Maintenance
6. Equipment and furniture
7. Overhead
8. Miscellaneous expenses

Osburn and others (1974a and 1974b) structured cost factors into two categories: current operating expenditures, and capital outlay expenditures associated with equipment and facilities. Under current operations, they divided expenditures into (a) instruction costs, and (b) administration costs, and (c) operation and maintenance costs. The FTE student, defined as 540 contact hours of instruction, was used as the enrollment statistic.

In his 1972 study, Lindman collected these data:

1. Direct expenditures for vocational programs,
2. Total direct expenditures,
3. Master class schedules for the schools in the district,
4. The floor areas of classrooms used for instruction within the district, and
5. The number of FTE teachers in the programs and services provided by the district.

In his earlier report, Lindman (1970) stated the necessity for classifying all current public school expenditures into three categories if costs were to be accurate. The three categories were:

1. Direct costs of instructional programs,
2. Indirect costs of instructional programs, and
3. Costs not charged to instructional programs (p. 22).

Using the 1957 issue of the Financial Accounting Handbook, as Deuker and Altman had, he placed all current expenditures into these categories:

Administration
Instruction
Attendance and Health Services
Pupil Transportation Services
Operation of Plant
Maintenance of Plant
Fixed Charges
Food Services and Student Body Activities
Community Services (p. 23)

It was his decision to exclude any depreciation allowances for capital investments, observing that in public school accounting, "the concept of depreciation is seldom used except for the purpose of determining the insurable value of buildings and equipment" (p.11). In the 1970 study, Lindman's total cost of a program was represented by the sum of A+B+C below.

A. Program Administration

    1. Program Directors' Salaries
    2. Assistants' Salaries
    3. Director's secretarial salaries
    4. Travel and office supplies

B. Instruction

    1. Program Supervisors' Salaries
    2. Program Teachers' Salaries
    3. Other Salaries of Instruction for Program
    4. Textbooks for Program
    5. Teaching Supplies for Program
    6. Other Expenses for Program

C. Maintenance of Plant

    1. Repair and Replacement of Instructional Equipment for Program (p. 16).

Partly as a result of some of the recommendations of the National Commission on the Financing of Postsecondary Education, NACUBO formed the Committee on Costing Standards to exert leadership in the area of costing procedures in higher education. The firm of Peat, Marwich, Mitchell and Co., performed the staff work associated with the project. They stated that for the first time considerations representing a foundation for determining cost information in higher education had been documented. These considerations were stated as:

(1) the purposes of cost information,
(2) definitions of cost,
(3) cost objectives and costing units,
(4) types and classifications of cost,
(5) relationship of financial accounting and statistical data to costing,
(6) cost determination methods and approaches,
(7) cost analysis, and
(8) costing standards.

"Cost analysis for information exchange purposes must eliminate methodological differences among institutions so that cost comparisons highlight only the true functional differences" (NACUBO, 1976, p. 3). Therefore, NACUBO recommended certain procedural changes as a result of the Costing Standards Committee's document on fundamental considerations, and the National Center for Higher Education Management Systems (NCHEMS) staff had agreed that these particular changes to Cost Analysis Manual (CAM) and Information Exchange Procedures (IEP) were appropriate:

(1) Interest on outstanding debt should be included in full cost.

(2) Guidance concerning the exclusion of nonmandatory transfers from current unrestricted funds should be provided in costing procedures.

(3) Appropriate operating expenses of the central administration of a higher education system should be included in full cost.

(4) Allowance for variances in depreciation or use charge rates on the useful life of assets should be made.

(5) Provision should be made for other indirect cost allocations which may be as equitable, yet more practical and reasonable.

(6) IEP should indicate that costs are to be based on the accrual method of accounting.

(7) Rental expenditures should not be co-mingled into one activity center entitled "capital cost."

(8) More detailed guidance should be provided concerning the use of costing units.

(9) Provision for doubtful student loans should be included in full cost.

(10) IEP should indicate that costs and official records of the institution should be reconciled.

(11) CAM and IEP should indicate that nonfinancial measures used as costing units should be reconciled to official records of the institution.

(12) CAM cost procedures should be expanded to describe the process involved in determining program costs.

(13) A more detailed description should be provided of the difficulties and limitations inherent in the current process of faculty activity reporting.

(14) CAM and IEP should provide a detailed discussion of how cost information may be used by management.

(15) Discussion should be provided indicating that comparisons among institutions of unit cost information of HEGIS disciplines may be misleading unless a detailed analysis of the purposes and activities of each discipline are provided.

(16) A more precise definition of cost should be provided. (NACUBO, 1976, p. 5)

The second group of recommended changes dealt with the need for additional research before appropriate treatment could be given to costs incurred when two or more services are provided in a single process.

The third group of recommendations were not resolved between NACUBO and NCHEMS with respect to information exchange between institutions. However, agreement was reached on changes for costing for internal management purposes. Group 3 NACUBO recommendations were:

(a) Distinction should be made between direct and indirect cost within a cost objective.

(b) Recognition should be given to the possibility that the cost of academic department supplies and expenses may be direct rather than indirect.

(c) CAM and IEP should recommend that nonfaculty compensation be treated as direct cost to the extent that such cost can be related directly to a cost objective.

(d) Reversal of charges between departments should not occur unless the charges are arbitrary and capricious (except for comparison of direct cost as defined in IEP).

(e) The inclusion of rental expenditures as capital cost as required by IEP for direct cost comparisons may not be meaningful.

(f) The present definition of direct cost as used in CAM and IEP should be modified to agree with the generally accepted definition used in cost accounting, and consideration should be given to comparing the major categories of cost described in CAM and IEP rather than comparing "direct cost."

Galloway's study team worked in conjunction with the State's Division of Vocational Education to select the schools and programs included in his study. The site selection criteria included a balance in terms of: (a) geographical location, (b) urban/rural location, (c) size of community served, (d) number of years the vocational programs had been in operation, and (e) type of school.

In the study procedures adopted by Galloway and Ghayalak (1972), discussion with school and district administrators about financial and supportive operations of vocational programs contributed to the researchers' understandings and ability to interpret data collected at the schools. The visits to the schools were considered an essential activity.

M. A. Harris (1972) selected criteria to enable comparisons of the costs of vocational-technical programs in terms of the price levels in different geographical regions. He selected sites where:

1. Only programs offered in Area Vocational/Technical Schools would be included.
2. A minimum of 15 full-time enrollment.
3. A mix of programs to include both males and females would be selected.
4. Programs must have served secondary and non-secondary students.
5. The maintenance of the physical plant of the area center be allocated from district-wide expenditures for plant maintenance.

He found that price levels are different among geographical regions and costs of programs are affected.

G. W. Harris (1973) conducted a microanalysis of vocational-technical program costs in selected high schools in Tennessee. His study analyzed a sample of existing courses to determine the per pupil-contact-hour cost for the vocational-technical education programs in the state. Procedures used for computing current unit cost per student were as follows:

1. A sample was selected;
2. The selected schools with vocational-technical education programs were contacted and permission granted to collect the data necessary for completion of the study;
3. Each school was visited to gather these data:
    a. Name, position and salary of each professional staff member associated with the vocational-technical program;
    b. A class schedule for the current school year amended to provide (1) name and numbers of each section taught, (2) credit and contact hour for each course, (3) enrollment, and (4) names of instructors;
    c. A copy of documentation describing each course and curriculum offered;
    d. A copy of the financial report for the fiscal period including all expenditures for current operations allocated to instructional departments;
    e. The number of full-time equivalent students enrolled in each curriculum for the year;
4. Analyses of the data were made to determine:
    a. Direct costs per student contact hour for each course,
    b. Indirect costs per student contact hour for each course without assignment of value to site or location;

c. Indirect costs per student contact hour for each course with assignment of value to the site and location;

d. Total cost per student contact hour for each course;

e. Total cost of educating a student in each course offered; and

f. Projections of course and program costs in terms of existing and maximum enrollments for a five year period (using an inflationary change factor of five percent).

Harris developed his own instruments to provide the data needed for analysis, following closely the expenditure classifications expected to be found in existing financial records, i.e., those found in Handbook II.

Aldrich's (1972) study sought to determine vocational education program costs at two delivery levels, secondary and postsecondary. To accomplish the purpose of his study, it was necessary to achieve three objectives: (a) identification of the current costs of vocational education programs, (b) establishment of program unit costs for meaningful comparisons, and (c) creation and testing of a formula to estimate and control allocation of vocational program costs.

The first objective, current costs of vocational programs, required development of a program accounting procedure including identification of a chart of accounts and procedures for prorating indirect costs. The second objective required development of a basis for meaningful cost comparisons, and the third objective was self-explanatory.

To Aldrich, there were four critical areas of concern in studies relating to determination and/or estimation of vocational education program costs: (a) budget chart of accounts, (b) proration of indirect costs, (c) base unit of measure, and (d) development of cost estimation formula(s). His budget chart of accounts was developed by adaptation of various aspects of Program Planning Budgeting Systems (PPBS).

Aldrich's (1972) literature review revealed several approaches to proration of indirect costs. Referrring to Badger's (1945) proposed guidelines, he stated that more than one proration method is needed, suggesting consideration be given to these bases: (a) student enrollment, (b) student contact hour of instruction, (c) student credit hour of instruction, and (d) square footage (for plant operation and maintenance). These align well with Badger's suggested five allocation bases: (a) direct charges, (b) time, (c) floor space, (d) ADA, and (e) actual number of persons served.

Aldrich concluded that proration of indirect cost for general support and for plant operation and maintenance was critical in determining the precise total cost of an instructional service. His findings revealed ineffectiveness in the vocational cost estimation formula. Failure of the formula was indicated by the extreme fluctuation of costs within each vocational program.

Gasior's (1975) data analysis procedures to determine per pupil costs at each of three defined expenditure levels (district, building, and program), were simply a summing of all expenditures at a level and dividing the sum by the number of students enrolled at the level being examined. Enrollment measures used included both average daily enrollment (ADE) and average daily attendance (ADA). Vocational education per pupil costs at the building level and the program level were determined using the same procedure: sum of expenditures divided by student ADE or ADA. The total per pupil cost identified was simply the sum of the per pupil costs identified at each level. Total program costs were determined by multiplying the total per pupil costs times the ADE and ADA student count in the program being examined. Percentages of total cost by level were also computed. An example (Gasior, 1975, pp. 21-22) follows:

AVERAGE DAILY ATTENDANCE BASE
PRACTICAL NURSING

Category	Amount	Percent
District Per Pupil Costs	$ 876.84	36
Building Level Per Pupil Costs	358.77	14
Vocational Building Level Per Pupil Costs	262.21	11
Program Level Per Pupil Costs	945.85	39
Total Per Pupil Costs	$2,443,67	100
Total Program Costs for 16 Students	$39,098.72	

Gasior (1975, p. 45) quoted Sorenson's (1972) supporting statements advocating use of program structures as in PPBS to aid in categorization of budget accounts and program costs.

Swanson's (1976) study procedures for the cost analysis phase were as follows:

1. Average salary was multiplied times FTE teachers;
2. Fringe benefits were computed by a designated "x" percentage of (1) above;
3. For a comparison in neighboring high schools, the same procedure was used for grades 9-12 in the district;
4. Costs of operation and maintenance--actual expenditures were prorated to programs based on the ratio of area assigned for use to the total area available for use in the school or center including:
    (a) custodial salaries and benefits,
    (b) utilities,
    (c) insurance,

(d) certain contracted services, and

(e) (general) supplies and other expenses;

5. Actual expenditures for supplies, textbooks, certain contracted services, and other costs were identified directly with each program; and

6. General support costs: administration, clerical, supportive teacher's salaries and fringe benefits, and office supplies.

In the general education high school program, salaries and benefits of supportive personnel were included as general costs.

Kim and Harris (1976) defined costs as amounts expended for the purpose of achieving program objectives. To determine these costs they adopted the following procedures, as part of their analysis model:

1. Annual salaries of teachers within an instructional program--the actual annual salaries for regular teachers, substitutes, and temporaries were used. Salaries were allocated to a program based on teaching time by the equation:

$$AAS = \sum_{i=1}^{n} S_i \cdot T_i$$

Where, AAS = Actual annual salaries

S_i = Annual salary of an individual

T_i = Percent of teaching time in the program

The alternate method of computing teaching salaries was to multiply average annual salaries of all vocational teachers by the full-time equivalent teachers (FTE) within a vocational program; i.e.,

$$AAS = fte \cdot \frac{TS}{FTE}$$

Where, AAS = Actual annual salaries

fte = fte within program

TS = All vocational teaching salaries

FTE = Total fte for all programs

2. Fringe Benefits--Sum of actual benefits paid; i.e.,

$$FB = \sum_{i=1}^{n} (RC_i + HI_i + LI_i + O_i)$$

Where, RC = Retirement

HI = Health Insurance

LI = Life Insurance

O = Other fringes

The alternate method was to multiply total actual salaries assigned to the program by a computed percent for fringe benefits paid by the school corporation as follows:

$$FB = AAS \cdot xP$$

Where, FB = Fringe benefits assigned to the program

AAS = Actual salaries of teaching staff within program

xP = Computed percent of the salaries for fringe benefits

3. Travel costs for instruction--Travel costs were the annual amounts of mileage expense and per diem paid to instructors who traveled, and student field trips for instructional purposes in relation to the program. A total amount of instructional travel costs was computed by:

$$TC = \sum_{i=1}^{n} (M_i \cdot ¢/m_i) + (D_i \cdot \$/d_i) + \sum_{j=1}^{n} FT_j$$

Where, TC = Travel costs for instruction

M_i = Total mileage of individual

$¢/m_i$ = Cents per mile

D_i = Total travel days of individual instructors

$\$/d_i$ = per diem

FT_j = Annual costs of student field trips

4. Costs of instructional supplies and materials assigned to the instructional programs--These costs were expenditures for consumable supplies and other materials for instructional purposes. If expenditures for instructional supplies and materials were allocated to all vocational programs, the expenditures were prorated to each of the instructional programs on the basis of student contact hours. The proration of instructional supplies and materials were formulated by the following:

$$ISMC = \frac{sch}{SCH} \cdot (C)$$

Where, $ISMC$ = Instructional supplies and material cost for a given instructional program

sch = Student contact hours for a given instructional program

SCH = Total student contact hours of the vocational program

(C) = Total expenses for instructional supplies and materials for the vocational program

5. Costs of classroom and laboratory facilities and equipment used by the instructional program--These costs were total amounts of yearly depreciated costs of classroom and

laboratory facilities and equipment used by the instructional program. Depreciated costs were estimated by dividing original cost by life expectancy. If the use of facilities and equipment was shared with other instructional programs, the annual costs were prorated to a given program on the basis of percentage of use in the program. Actual annual costs were computed as follows:

$$FEC = \sum_{i=1}^{n} \frac{OC_i}{Y_i} \cdot X_i$$

Where, FEC = Actual annual costs of classroom and laboratory facilities and equipment used by a given instructional program

OC_i = Original cost of items

Y_i = Life expectancy of items

X_i = Percentage of use of a piece of equipment for a given instructional program

6. Building use costs assigned to the instructional program--This was the cost of using a building by the instructional program for a fiscal year. The building use cost was determined by dividing the original cost by life expectancy (Handbook II, p. 168), as follows:

$$BUC = \frac{OC}{Y}$$

Where, BUC = Building use cost for a year

OC = Original cost of vocational building

Y = Life expectancy

For actual building use cost for a given instructional program the annual cost of the vocational building was prorated to the instructional program on the basis of percentage of space and time used for the program. Annual actual building use cost of a given program was expressed by:

$$AABUC = AC \cdot \frac{(A)}{(B)} \cdot \frac{(C)}{(D)}$$

Where, AABUC = Actual Annual Building use cost of the instructional program

AC = Total annual cost of vocational building

(A) = Square feet of building space used by the instructional program

(B) = Total square feet of vocational building space

(C) = Instruction hours for a given program

(D) = Total instruction hours for the vocational programs

A sum of all costs of the six items account for the instructional direct costs. When evaluating one program within a school or comparing two or more programs in the same school, building use costs were excluded from the direct cost of the instructional program.

Next, supporting services indirect costs were prorated to the instructional program through the following procedures:

1. Student support service costs prorated to the vocational instructional program -- These costs include expenditures for (1) attendance and social work, (2) guidance, (3) health, (4) psychological, and (5) speech pathology and audiology services for improving the well-being of students and supplementing the teaching process.

Total amounts of expenditures for student services were prorated to the instructional program on the basis of average daily membership (ADM), using the following formula:

$$PSSC = \frac{adm}{ADM} \cdot (C)$$

Where, PSSC = Prorated student services costs to a given program

adm = Average daily membership in the instructional program

ADM = Total average daily membership of school corporation

(C) = Total expenditures for student services of school corporation

2. Instructional staff services cost prorated to the instructional program -- These costs were amounts paid for those activities associated with (1) improvement of instruction and (2) educational media services for assisting the teaching staff. Total expenditures for instructional staff services of a school corporation were prorated to the instructional program on the basis of full-time equivalent teachers by use of the following formula:

$$PISSC = \frac{fte}{FTE} \cdot (C)$$

Where, PISSC = Prorated instructional staff services costs for a given instructional program

fte = Full-time equivalent teachers for the instructional program

FTE = Total full-time equivalent teachers within school corporation

(C) = Total expenditures for instructional staff services of school corporation

3. General administration services costs prorated to the instructional program -- These expenditures were amounts paid for services directed toward establishing and administering policy in connection with operating the school corporation, including board of education services and executive administration services. General administrative costs were prorated to the instructional program on the basis of full-time equivalent teacher as shown in item 2, above.
4. School administration services costs prorated to the instructional program -- These costs were amounts paid for services concerned with overall administrative responsibility for a school operation such as the principal's office services. School administration services costs were prorated to the instructional program on the basis of average daily membership as shown in item 1, above.
5. Business services cost prorated to the instructional program -- These costs were amounts paid for activities concerned with purchasing, transporting, and maintaining goods and services. For analytical purposes, business services cost were categorized into (1) operation and maintenance of plant, (2) pupil transportation and food service, and (3) fiscal, and internal services for operating all schools, and were prorated to the instructional program using a different prorating basis for each category of services.

   The proration of costs for operation and maintenance of plant were based on proration of space and time used in the instructional program. Prorated plant operation and maintenance costs were estimated by:

$$\text{PPOMC} = \frac{(A)}{(B)} \cdot \frac{(C)}{(D)} \cdot (E)$$

Where, PPOMC = Prorated plant operation and maintenance costs for a given instructional program

(A) = Square feet of building space used by the instructional program

(B) = Total square feet of building space of school corporation

(C) = Instruction hours for the program

(D) = Total instruction hours of school corporation

(E) = Total amounts paid for plant operation and maintenance of school corporation

Amounts paid for pupil transportation and food service were prorated to the instructional program on the basis of average daily membership (ADM) as shown in item 1, above; whereas amounts paid for fiscal and internal services were prorated to the instructional program on the basis of full-time equivalent teachers as shown in item 2, above. A total of the prorated costs of these three categories represents business services cost prorated to the instructional program.

6. Central support services costs prorated to the instructional program -- These costs were amounts paid for services of (1) planning, research, evaluation, and staff services, and (2) statistical and data processing services from the central office. For the first category of services, the number of

full-time equivalent teachers was used in prorating total amounts paid for the services to the instructional program in the same way as shown in item 2; whereas average daily membership (ADM) was used in prorating amounts paid for the second category of services to the instructional program using the same method as shown in item 1.

After these prorating procedures were completed, the prorated costs of all supporting services were added to the supporting indirect cost of the instructional program. The sum of the direct and indirect cost represents a total cost of the vocational instructional program. Based upon the annual budget, total costs of vocational program was determined by repeating the same procedures as mentioned above. These costs were called budgeted total costs of vocational programs (pp. 53-60).

Discussion--Cost Finding and Analysis

Effective cost determination requires not only the identification of expenditure components which reflect the inputs required to support a particular program, course, or activity; but also the development of consistent and appropriate procedures by which to attach costs to those activities, courses, or programs.

Major problems include, first, determination of what constitutes direct costs. One perspective advocated that all expenditures which could be related to courses, including instructional equipment and building operation expenditures, be included in direct costs. However, another perspective indicated by several sources in the review seems to be based on the consideration that such detail is not practicable.

Among indirect costs (those which cannot be readily or accurately traced to or identified with specific courses or program areas), the major issue is the treatment of capital outlay and instructional equipment costs. As equipment and buildings are not consumed in a single year, there is reason not to consider such expenditures in a single year as program area or course operating costs for that year. Possible methods of treating such costs include memorandum accounting, isolation of start-up costs for new programs and courses from operating costs, and inclusion of depreciation costs for buildings and/or equipment among operating expenditures. Given the unresolved questions in treatment of capital outlay and equipment costs, memorandum accounting may be the appropriate decision until the matter is clarified in a generally acceptable manner.

In allocating indirect costs, major issues are the bases and methods of allocation of cost. Major methods of allocation include per pupil, per teacher, per unit time, and per unit space bases.

The studies reviewed show differing cost units, cost centers, cost elements and groupings, and means of allocation of costs to units and centers in attempting to determine cost levels. To a degree, some of the above differences are due to organizational idiosyncracies of the samples or populations studied. Other differences are due to contrasting points of view on cost finding issues. In spite of differences and remaining issues, the studies show an increasing specificity of technique and gradual clarification of problems and issues.

Literature Review Summary

In summary, the determination of vocational education costs is a necessary endeavor for policy formulation, implementation, and analysis in relation to vocational education funding. There has long been an interest in determining educational costs, but in a time in which resources for education are scarce and in competition with other public services for the pool of governmental dollars, the increased interest is partly due to the necessity of proving need for the funds required to provide the publicly desired quality and quantity of vocational education services.

The value of results indicated by educational cost studies has been increasing in recent years, due to a number of factors. Firstly, while there is still wide diversity in degree of detail shown in pupil and fiscal accounting data and in the accounting systems used by local educational agencies, the quality of such data has been improving. Secondly, the increasing use of cost accounting by local education agencies has provided more accurate and readily interpretable information. Thirdly, a number of states have attempted to develop program area and course cost indices, along with the data gathering systems by which to formulate and maintain the currency of such indices. Fourthly, there has been a refinement of cost study and cost determination techniques.

Nevertheless, the difficulty of the task of cost determination should not be underestimated. The validity of any such determinations depends upon the ability to locate and/or formulate equivalencies in cost and enrollment data. The data available depend on purposes of analysis and "acceptable practice" in enrollment and fiscal accounting on the part of state and local educational agencies.

A further problem in cost studies that attempt to provide a basis for cost determination involves decisions as to collecting and structuring data. Such decisions include (1) determination of practical cost units which, at the same time, are standardized (or which can be standardized) and provide an effective comparative base; (2) selection of the most practical and effective cost centers; (3) formulation of effective cost elements and categories which will enable effective allocation and interpretation; and (4) the formulation of effective cost allocation and cost-finding techniques which accurately attach expenditures to cost units in cost centers. Particular problems include the treatment of indirect costs, start-up versus operating costs, and capital outlay and equipment costs.

For cost comparison purposes an additional problem relates to the selection of an appropriate referent comparison cost center. At the secondary school level, the "basic" (regular academic) programs appears the appropriate comparison center. However, problems arise from differences in grade levels included in state and local definition of the basic program. Problems also exist in selecting comparison cost centers for area vocational centers serving secondary and adult students.

Given the purposes of formulation of effective cost determination and cost comparison efforts in relation to vocational education, the literature seems to suggest the following.

1. The most effective cost units appear to be FTE student units based on student contact hours.

2. The cost centers for which accurate data currently exist may be the program area, rather than courses, particularly for indirect costs.

3. Indirect costs are more practically and accurately allocated on a

per FTE student basis, rather than on a space or FTE teacher basis. Exceptions may include costs for services to teachers, rather than students.

4. Capital outlay and equipment costs might best be handled, at the present, by memorandum accounting.

5. The basic program may be best defined as instruction other than vocational instruction.

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CHAPTER 3

FIELD TESTS

Introduction

This chapter briefly reviews the preliminary model development and testing, provides a comprehensive statement regarding the field-test site selection, briefly describes the site visitation processes, and provides the summaries of our data analysis and findings relative to both the quantitative and qualitative aspects of the data. The summary of the findings is offered in Chapter 5.

Although program area costs and course costs were determined as a result of project activities, and provide some insights to programmatic costs at both secondary and postsecondary educational agencies, it must be kept in mind that the central purpose of the project was model development and testing. And, the planned product of the research and development activities was the User Manual. Therefore, we caution readers of the section of this chapter on data analysis and findings that the sample is not intended to be representative of American secondary and postsecondary institutions except as they relate to testing appropriate student and fiscal accounting structures.

Certainly, one would not be in a position to recommend fiscal policy based on the expenditure data utilized in the model testing activities; caveat de facto!

Preliminary Model

A preliminary model was developed based on initial conceptualizations of project purposes. Although the basic concept of the model dimensions (program, location, and accounting elements) remained the same, our literature review suggested certain modification of the accounting elements. Further, the literature review provided the basis for element definitions that led to an operational model.

Once the model had been defined and basic data gathering instruments had been developed, two planned tests were made simultaneously. First, a paper was written describing each aspect of the model. That paper, along with the criteria established in the RFP, was sent to the project review panel for critique. Second, three visits were made to nearby educational agencies (2 school districts and one postsecondary institution) to gain insight as to how their data were organized and an assessment was made relative to the number of manhours required to gather the necessary data. A field-test site was then visited by all members of the project team for purposes of (1) providing supervised experience for project staff and (2) giving the data instruments their first actual test. Several modifications were made in data elements and in the format of the instruments following that test. Also, panel reviews were received during the modification process and those suggestions were incorporated into the data sets and procedures. Of primary importance was a method developed to track teacher assignments to all courses and to track payroll data to courses. Although time consuming, the developed audit structure worked well during the planned site visits. Therefore, the instrumentation included in Chapter 4 (User Manual represents the product of a number of conceptual drafts, preliminary testing, panel critique, and our planned testing activities. Subsequent to our test-site visits and data reduction, the "tested" model was again submitted to the project review panel for critique. Those suggestions were incorporated in the User Manual and it was then sent to the Bureau of Occupational and Adult Education for in-house critique.

Field-Test Site Selection

Model Development and Field-Testing objectives required that the contractor demonstrate the capabilities of the model by using the model to gather and report the data specified in selected school districts for secondary level offerings and in selected institutions for postsecondary offerings.

Further, the objectives required that those field-test sites satisfy the following criteria:

(1) Selected from no less than four (4) states which are demographically diverse and not predominately representative of one geographical region of the United States.

(2) Geographic and demographic criteria were suggested.

(3) Selected from school districts which enroll no less than thirty-five (35) percent of the [secondary] students in vocational education programs.

(4) Selected from postsecondary institutions which enroll no less than forty-five (45) percent of the students in vocational education programs.

(5) Selected from school districts and postsecondary institutions which represent a variety of practices relative to acquisitions and reporting of student attendance and financial information.

On September 9, 1976, Institute staff members met with the Project Officer and, among other things, reviewed the above criteria for field-test site selection, extracted here from the RFP. Agreement was reached that the criteria for selecting states and field-test sites within those states should be applied in the following order, from most important to least important:

(1) Program Comprehensiveness--selection to be made based upon insuring representation of program offerings in each of the seven occupational areas.

(2) Data Acquisition and Reporting Practices--selection to be made based upon insuring model testing at sites which vary in the means used to collect and report both student and financial information.

(3) Program Enrollment Level--selection to be based upon school districts enrolling thirty-five (35) percent of secondary students in vocational education programs and postsecondary institutions enrolling forty-five (45) percent of their students in vocational education programs.

(4) Demographic Conditions--selection to be based upon demographic conditions which insure representation of urban and rural populations.

(5) Geographic Regions--selection to be based upon no less than four states which are not predominately representative of one geographic region of the United States.

Two phases were planned to discriminate sites which meet Office of Education criteria for site selection. In the first phase, Office of Education criteria for site selection were utilized to select states from which model-testing sites were to be identified. State Department officials in all states selected were contacted and the cooperation of these education officials was sought prior to implementation of the second phase of the site selection process. Whenever possible, project staff obtained current data on enrollments and subjective assessments of data gathering and reporting practices at potential sites from state school officers. The second phase consisted of the actual selection of sites which met U.S.O.E. criteria relative to demographic, enrollment, and data acquisition-reporting practice variables.

Selection of States

Since program distribution across the seven program areas was the criterion of primary importance, each of the fifty states was evaluated relative to the comprehensive program criterion. Based upon the latest available data for secondary school occupational programs (Osso, 1973) and the latest available data for postsecondary schools with occupational programs (Kay, 1975), ten states were identified which had at least one school district and at least one public postsecondary institution offering programs in all major vocational areas.

Utilizing the published reports cited, the following ten states satisfied the comprehensive program criterion and were identified for further screening in phase one of the site-selection process:

California
Colorado
Florida
Idaho
Illinois
Indiana
Pennsylvania
Mississippi
New York
Michigan

In order to fulfill the requirements of the second U.S.O.E. criterion, the ten states selected on the comprehensive program criterion were classified relative to two indicators of data acquisition and reporting practice. The first approach was to ask knowledgeable persons in the Office of Education and the National Center for Education Statistics to classify the ten states relative to the degree of detail found in each state's system for acquisition and reporting of student and fiscal information. The purpose of this poll was to increase the probabilities that a range of data acquisition and reporting practices would be available among the states selected for model testing. Nomination in a particular category in no way reflects upon the competency of school districts and states; it simply suggested the level of detail available in each state's pupil and fiscal accounting and reporting. Based upon the information provided by those O.E. and N.C.E.S. personnel polled, the ten states were nominally grouped into one of two categories reflecting either more detailed or less detailed acquisition and reporting of student and fiscal information.

The second approach used to satisfy the criterion of data acquisition and reporting practice involved classification of the ten states based upon the method of pupil accounting utilized to report data. The purpose of this classification was to insure that all three of the most widely accepted pupil accounting systems would be represented among the sites selected. Table 3.1 presents the groupings of the ten states based upon degree of detail in data acquisition and reporting practice and each state's pupil accounting method.

TABLE 3.1

PUPIL ACCOUNTING METHOD

		Average Daily Attendance	Average Daily Membership	Full-Time Equivalent
DATA ACQUISITION AND REPORTING	MORE DETAIL	Colorado Illinois New York	Michigan Pennsylvania	Florida
	LESS DETAIL	California Idaho Mississippi	Indiana	--

As a third consideration in the selection of states the total number of sites which met the comprehensive program criterion was identified within each of the ten states. Tables 3.2 and 3.3 present a rank ordering of the ten states respective to the number of public secondary schools and postsecondary institutions having programs in all major vocational areas. (Included in the rank-order is a list of the prospective sites which meet the comprehensive program criterion.) To insure the greatest possible number of sites available for model testing, those states with the highest number of potential sites were given priority consideration for participation in the second phase of the site selection process.

TABLE 3.2

RANK ORDERING OF TEN STATES RELATIVE TO THE NUMBER OF PUBLIC SECONDARY SCHOOLS WITH PROGRAMS IN ALL MAJOR VOCATIONAL AREAS

State	District	School
Illinois (17)	Alton	Alton Sr. High
	Belvidere	Belvidere Sr. High
	Cahokia	Cahokia High
	Carmi	Carmi Comm. Unit High
	Chenda	Chenda High
	De Kalb	De Kalb Sr. High
	Freeport	Freeport Sr. High
	Galesburg	Galesburg Area Vocational Center
	Genda	Genda Kingston Sr. High
	Harvard	Harvard High
	Lincoln	Lincoln High
	Mattoon	Mattoon High
	Mendota	Mendota Twp. High
	Murphysboro	Murphysboro Twp. High
	Payson	Payson High
	St. Elmo	St. Elmo
	Streator	Streator Twp. High
	Toluca	Toluca High
Michigan (9)	Deerfield	Deerfield Jr./Sr. High
	Flint	Atherton High
	Greenville	Greenville Sr. High
	Holland	West Ottawa Jr./Sr. High
	Jackson	Parkside High
	Mt. Pleasant	Beal City High
	Pellston	Pellston
	Saranac	Saranac Jr./Sr. High
	St. Johns	St. Johns High
California (8)	Castro Valley	Castro Valley High
	Fairfield	Armi High
	Hacienda La Puente	Glen A. Wilson High
	Hacienda La Puente	Los Altos High
	Los Angeles	Alain Leroy Locke High
	Orange	Orange High
	San Leandro	Pacific High
	San Leandro	San Leandro High

TABLE 3.2 continued

State	District	School
Pennsylvania (7)	Bethlehem	Bethlehem AVTS
	Butler	Butler Area Sr. High
	Chambersburg	Franklin Co. AVTS
	Johnstown	Greater Johnstown AVTS
	Mechanicsburg	Cumberland-Perry AVTS
	Uniontown	Fayette Co. AVTS
	York	York Co. AVTS
Florida (5)	Dade County	Miami Central Sr. High
	Charlotte County	Charlotte High
	Palm Beach County	North Central Tech. Ed., Center
	Sarasota County	Sarasota Co. Voc. Tech.
	Washington County	Washington Holmes Voc.-Tech.
Indiana (5)	Columbus	Columbus High
	Elkhart	Elkhart High
	Greencastle	Greencastle High
	Plymouth	Plymouth High
	Wabash	Wabash High
New York (4)	Bath	Steuben BOCES
	Flushing	John Bowne High
	Potsdam	St. Lawrence BOCES
	Yorkville	Onei Madi Herk BOCES
Colorado (2)	La Junta	La Junta High
	Las Animas	Las Animas High
Idaho (1)	Dayton	West Side Jr./Sr. High
Mississippi (1)	Columbus	Lee High

Source: Nicholas A. Osso, U.S. Dept. of HEW, National Center for Educational Statistics, 1973.

TABLE 3.3

RANK ORDERING OF TEN STATES RELATIVE TO THE NUMBER OF PUBLIC POSTSECONDARY INSTITUTIONS WITH PROGRAMS IN ALL MAJOR VOCATIONAL AREAS

State	School
California (23)	Bakersfield College Barstow College Compton Community College Fresno City College Fullerton Junior College Golden West College Antelope Valley College Yuban College Modesto Junior College Moorpark College Merrit College Shasta College Reedley College American River College Hartnell College San Bernadino Valley College College of San Mateo Contra Costa College Santa Roas Junior College West Valley Community College San Joaquin Delta College El Camino College Mount San Antonia College
Florida (8)	Polk Voc.-Tech. Center Pinellas Voc.-Tech. Institute Broward Community College Palm Beach Junior College Lindsey Hopkins Ed. Center North Technical Ed. Center St. Petersburg Junior College Polk Community College
Illinois (8)	Chicago City College-Loop Parkland College Danville Junior College Sauk Valley Community College Illinois Central College College of Dupage Triton College Rock Valley College

TABLE 3.3 continued

State	School
New York (6)	SUNY Ag. & Tech. College at Alfred SUNY Ag. & Tech. College at Canton SUNY Ag. & Tech. College at Cobleskill Lewis A. Wilson Tech. College SUNY Ag. & Tech. Collete at Farmingdale SUNY Ag. & Tech. College at Morrisville
Idaho (3)	Boise Area Voc.-Tech. School North Idaho College Pocatello Area Voc.-Tech. School
Michigan (3)	Washington Community College Lansing Community College Delta Community College
Colorado (2)	Community College of Denver Trinidad State Junior College
Pennsylvania (2)	Eastern Northhampton County Voc.-Tech. School Williamsport Area Community College
Indiana (1)	Vincinnens University
Mississippi (1)	Jones County Junior College

Sources: Evelyn R. Kay, Directory of Postsecondary Schools With Occupational Programs, 1973-74, U.S. Dept. of HEW, National Center for Educational Statistics, 1975.

1974 Community & Junior Colleges Directory, Washington: American Association of Community & Junior Colleges, 1974.

The states of California, Illinois, Florida, Michigan, and New York were initially selected for possible further participation in the study, but the process of contacting state-level staff in order to obtain their cooperation in the study necessitated substitutions and additions to state selections. New York declined to participate in the study, and Pennsylvania was substituted in order to provide geographic representation for the Northeastern United States. Idaho was included in order to insure sufficient representation among states with less-detailed reporting systems, increase representation of states with a substantial rural-agricultural demographic profile, and increase the representation of the western region of the United States.

The six states finally selected and willing to cooperate in the second phase of the selection process were California, Idaho, Illinois, Florida, Michigan, and Pennsylvania. The states selected not only insured that a large number of sites would be available for consideration in the site selection phase of the study, but permitted examination of a wide range of data acquisition and reporting practices, allowed for a range of site selection based on an urban to rural continuum, and enabled selection to be based upon representation from all major regions of the United States. The six states provided forty-seven (47) prospective site choices at the public postsecondary level and forty-seven (47) prospective site choices at the public secondary level. Three states used average daily attendance as their pupil accounting method (California, Idaho, and Illinois), while two states used average daily membership (Michigan and Pennsylvania) and one used full-time equivalency (Florida). Two states, California and Idaho, were calssified as relatively less detailed in their data acquisition and reporting practices. Five states had a substantial percentage of their population in urban areas, yet their percentage of population employed in agriculture was sufficient to suggest that, with the inclusion of Idaho, rural sites as well as urban sites would be available for model testing. (See Table 3.4 for a breakdown of demographic factors associated with each of the ten states).

TABLE 3.4

SELECTED ECONOMIC AND DEMOGRAPHIC CHARACTERISTICS OF SAMPLE STATES

State	Percent Employed In Agriculture (1970)	Percent Employed In Manufacturing (1970)	1975 Per Capita Income	Percent of Popn. in Urban Areas (1970)	Ethnic Mix (percent)			
					Black (1970)	Spanish Heritage (1970)	Indian (1970)	Oriental (1970)
California	3.1	21.6	5997	90.9	7.0	15.5	0.4	2.6
Colorado	4.6	14.6	5343	78.5	3.0	13.0	0.4	0.4
Florida	4.6	14.1	5235	80.5	15.3	6.6	0.1	0.2
Idaho	13.0	14.7	4934	54.1	0.3	2.6	0.9	0.4
Illinois	2.7	30.3	6337	80.9	12.8	3.3	0.1	0.4
Indiana	3.4	35.9	5263	64.9	6.9	1.3	0.1	0.1
Mississippi	7.5	25.9	3764	44.5	36.8	0.4	0.2	0.1
New York	1.3	24.2	6244	85.6	11.9	4.8	0.2	0.6
Michigan	1.8	35.9	5928	73.8	11.2	1.4	0.2	0.2
Pennsylvania	1.8	34.1	5490	71.5	8.6	0.4	0.1	0.1

Selection of Sites

The second phase in the selection process involved contacting state department of education staff in order to identify sites within states which would fulfill selection criteria as of the 1975-76 fiscal year. State department of education staff were contacted twice. In the first contact, letters introducing the project's purposes were mailed to the Chief State School Officer and a phone call follow-up elicited information on prospective site characteristics as of 1975-76. During the telephone interview administrators were asked to rank the reporting practices at prospective within state sites, give current ratios for vocational programs vis-á-vis total enrollments at each site under consideration, and characterize the comprehensiveness of programs offerred at each prospective site. The second contact with state department of education staff consisted of a letter informing them of the sites which were scheduled for actual visitations by project teams.

Once information and approval from state departments of education had been attained, individual sites were contacted by letter and follow-up telephone call. The project's purposes were explained and approval to conduct a site visit was sought.

Four sites in each state were initially identified and contacted by the project staff. Sites were identified by reference to geographic location once all other selection criteria had been fulfilled as nearly as possible. Where possible, sites contacted by project staff represented a range of characteristics within each state.

Approval and scheduling of actual site visitations resulted in some changes in the proposed selection protocol. All four of Michigan's identified sites were initially willing to participate in the study, but declined when an actual date was to be scheduled. Two Pennsylvania sites and one Idaho site also declined to participate after indicating tentative approval for a site visit. Reasons advanced for declining to schedule a date for site visitation included lack of time at the local level to assist the site visitation team, administrative change-overs, rejection of the proposed visitation by superordinates or policymaking boards, and drastic changes in curriculum or operations which would no longer qualify the prospective site under project criteria.

Table 3.' lists those sites which were visited by project visitation teams and gives a breakdown of criterion variables relevant to site selection. As will be noted, criteria for vocational total enrollment and program comprehensiveness could not be satisfied at all sites. These enrollments for 1975-76 fluctuated from the data available at the national and state department of education level for other years and the fluctuation at some sites left them below site selection criteria. Program comprehensiveness also fluctuated as state guidelines for vocational education and local curriculum changes were introduced in fiscal 1975-76. In some instances these two criteria were minimally altered in order to insure a sufficient number of sites.

TABLE 3.5

RELEVANT SELECTION CRITERIA FOR PARTICIPATING SITES

Site	State Data Collection Rating	% of Voc/Ed Students to Total Enrollment*	Minimum of Five OE Program Areas	Standard Metropolitan Statistical Area?
A	Better	19.6	Yes	No
B	Good	18.0	Yes	No
C	Best	11.3	Yes	No
D	Better	100	Yes	Yes
E	Good	7.1	Yes	No
F	Better	22.1	Yes	No
G	Good	25.7	Yes	Yes
H	Better	6.4	Yes	No
I	Good	18.4	Yes	Yes
J	Better	49.8	Yes	Yes
K	Good	82.5	Yes	Yes
L	Better	44.0	Yes	No
M	Good	27.6	Yes	No
N	Good	66.2	Yes	Yes

*Total enrollment figures vary in composition at the secondary level, ranging from grades 1-12 to 10-12, depending on data available. As most vocational courses and programs are concentrated in grades 10-12, some percentages of students enrolled in vocational education will be understated.

Site Visitation

There are two facets to the matter of procedures followed in the procuring of data in this study:

1. Techniques of securing cooperation and maintaining effective relations with site personnel.

2. Instructions to data gathering team members to insure adequate collection of data.

Establishing and Maintaining Cooperation with Site Personnel

As the initial contact, a letter was sent to the vocational director or equivalent, informing the director of the project staff's desire to include the district or institution among the sites chosen for the study. The letter informed the director of the nature of the study and the kinds of data and assistance requested. The letter also asked if a formal letter to the district superintendent of chief institutional officer would be desired in order to secure participation. It indicated that a follow-up telephone call would be made within a few days to discuss participation and needed clarification of the project's purposes.

In telephone calls to the vocational directors, it was emphasized that the study was not trying to conduct an official audit, evaluate programs, meddle, or interfere in any way with the internal operations of the district or institution. Any needed clarification and additional information was provided. The communication also informed the directors that an informational package, including data forms, background documents, and a cover letter would be forthcoming if they choose to participate.

Once cooperation had been secured, dates for data team visitation were negotiated and established. At the same time, the local vocational directors were asked for best procedures to follow to insure that local system protocol was followed with respect to all administrative staff who should be involved or contacted.

Once on site, the opening contact was with the vocational director, or equivalent, unless prior information on local system protocol advised otherwise. Courtesy visits were paid to the chief executive officer or, in the case of a large district or institution in which the chief officer did not wish to be involved, the immediate superior of the vocational director. In these contacts, the administrative personnel were supplied with a sample press release about the district's or institution's participation in the study.

Data collection teams depended upon the vocational director to bring team members into contact with other personnel, such as the finance officer, whose assistance was often required. In the event that a team member required further information as to how or where to pursue further data in the system, his central contact was the vocational director.

Once the data had been collected, exit visits were made to participating personnel, including the executive officer or superior of the vocational director, thanking them for their assistance and informing them that the team was departing.

Data Collection Teams

The size of the data collection team and the duration of the data gathering visit depended on the size of the educational agency visited. Each team member had participated in the development and testing of data instruments and data element definitions. Therefore, they were familiar with the data needs and an array of options to pursue given that data were not available in the form desired. Further, team members had participated in practice auditing exercises and either the Principal Investigator, Assistant Principal Investigator, or Senior Research Associate headed-up each visitation team.

Site visitation packets included data forms, sample press release, lists of principal site consultants, data source reference sheet, and instructions and reminders relative to protocol and data gathering procedures. Following each day's data collection, team members met at their hotel to assess data items which were available and the qualitative aspects of those data, and to determine those elements which were missing. Plans for subsequent activities were made and individual re-assignments were made. Telephone numbers of site consultants were secured for follow-up purposes. Copies of pertinent data sets were secured for audit purposes following the site visits and in a few instances, site consultants fowarded requested data unavailable at the time of the visit or as a result of follow-up requests.

Site visits were planned to minimize travel costs yet to accommodate requests of participating agencies. Where additional time was needed to complete an audit, teams were reorganized such that research asscciates completed those tasks while the team leader proceeded to initiate activities at the next scheduled site. Only in one instance were additional personnel required to complete the auditing activities.

Subsequent to each site visit, the team completed the auditing activities and developed data summaries and qualitative summaries about each site. Necessary follow-up requests for data and expressions of gratitude for participation were handled by each team leader.

Summaries of Data Analyses

The primary intent of the field-tests of the model was to assess the student and fiscal accounting data bases available at the sites with regard to the data requirements of the model for vocational program areas, vocational courses, and "basic" programs. Following the site visits, audit teams evaluated the sites in terms of data availability to exercise the model at various units of analysis--total vocational, vocational program areas, vocational courses, and various combinations of "basic" program definitions, among other assessments (see Appendix--Evaluation of Site Data). A synthesis of the assessments of each site follows with the data analysis for the site reviewed. Each site was assured anonymity with regard to their particular data. Therefore, the site designations given in the site visit summaries in the Appendix are not the same as those used in this section of the Report.

The format of the site reviews is as follows: (1) program data, (2) student accounting data, (3) fiscal accounting data, and (4) data analysis to determine added-cost relationships. Each section contains an assessment of the data with regard to maximum application of the model and the extra conversions required to exercise the model at various levels. However, the secondary educational agencies are distinguished from the postsecondary agencies and are presented first.

Secondary Educational Agency A

Program Data

Each vocational course in the school district was indexed with a local three-position alpha designator. The first character of the designator denoted the program area. To conform to U.S.O.E. vocational course numbers required(1) a renumbering of all courses or (2) develop a cross-over procedure. Some course titles were not sufficient to discriminate beyond two-digit O.E. classifications while most could be discriminated to four-digit O.E. classifications.

Student Accounting

Student accounting was based on average daily attendance (ADA) to conform with state reporting practices. Vocational enrollments were reported by (1) total enrollments and (2) unduplicated enrollments by vocational program area.

Agency level reporting included high school enrollments by classes (first month survey), therefore vocational enrollments at that point in time could be determined by course.

Five class periods per student per day for the academic year was the operational definition of a full-time-equivalent (FTE) student.

Conversions required to determine FTE students for each course included:

$$\text{Course enrollment} \quad \text{X} \quad \frac{\text{course hrs/week}}{5} \quad \text{X} \quad \frac{\text{course weeks}}{36}$$

Conversions required to determine FTE students for "basic" program:

(1) since costs of special education students would have required similar fiscal audit, those students were included in the "basic" program definition;

(2) since expenditures were not known by grade-levels or grade-level groupings other than total ADA, the "basic" program definition became ADA in grades K-12 less FTE enrollments in vocational courses.

Fiscal Accounting

Fiscal reporting of the agency was based on the required state object-of-expenditure classification. That classification is different from either edition of U.S.O.E.'s Handbook II although reclassifications of the accounts was a minor task for site auditors. However, expenditure data could not be related to special education, kindergarten, or grade-level groupings.

Vocational program fiscal data were limited to state reimbursement claim reports. Those reports, although following the object of expenditure classification system, designated expenditures at the program area level.

Actual teacher salary data were available from the personnel records of the agency and average employee benefits expense was utilized. Amounts for purchased services and supplies and materials were available at the program area only, taken from the state reimbursement claim reports.

Direct vocational administrative expense was available at the program area level Indirect expenses were prorated on either an FTE student or an FTE teacher basis in accordance with rules established.

Capital-outlay expense was available for the current year only and no special accounting was reported for special vocational program transportation.

TABLE 3.6. SUMMARY DATA SITE A

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	11,878.08	$12,624,689	$1,062.85	1.00
Business/O.O.	409.61	382,863	934.70	0.88
Dist. Ed.	246.00	209,951	853.45	0.80
Agri.	130.25	192,571	1,478.47	1.39
Health Occ.	54.00	72,575	1,343.98	1.26
Home Ec.	290.86	277,001	952.35	0.90
T. & I.	67.20	89,201	1,327.39	1.25
Technical	12.50	25,506	2,040.48	1.92
Other Voc. Ed. (pre-voc., indus. arts, work experience)	301.50	292,843	971.28	0.91
All Vocational	1,512.00	1,542,511	1,020.00	0.96

Secondary Educational Agency B

Program Data

Data were not available to determine course level enrollments or teacher assignments by courses. However, courses were numbered by three alpha and three numeric codes although no enrollment reports were available by courses. To conform to U.S.O.E. vocational course numbers required that either all vocational courses be renumbered or a cross-over procedure be developed.

Student Accounting

Student accounting was based on average daily attendance (ADA) to conform with state reporting requirements. Reports containing enrollment data for the "basic" program were not located and follow-up attempts to secure the data were unsuccessful. Vocational area program enrollments were identified from state reimbursement claims. Both program area student head-counts and average daily attendance statistics were available.

Five class periods per student per day was the operational definition utilized for a full-time-equivalent student. Since data were reported on an annual basis, the conversion required to determine FTE students for each program area would have been:

$$\frac{\text{Program area ADA}}{\text{180 days}}$$

however, no data were available to convert ADA to average daily membership, the more desirable pupil accounting statistic.

Since "basic" program data were not made available, no evaluation of those data may be made.

Fiscal Accounting

Fiscal data of the agency were available by both object-of-expenditure and by function, based upon Handbook II (1957) classifications. Analysis of vocational program area expenditures included auditing of teacher salary reports, proration of employee benefits, supply and materials assignment by the vocational program director, and direct vocational administrative expense also assigned by him. Planned prorations of indirect costs could not be made since "basic" enrollment data were not available. Also, capital outlay data were not available.

Our evaluations of both the student and fiscal data were limited. The rapid growth of the service area and curriculum of the school and the increasing complexity of program coordination among participating agencies has resulted in pressures whereby program development is ahead of pupil and fiscal accounting techniques. The data acquisition and reporting simply have not kept pace with the services offered.

Secondary Educational Agency C

Program Data

Each vocational course offered by the agency was reported by course title only and therefore required indexing by U.S.O.E. code by the auditing team. However, course discriminations were not made since it would require assignments of designators by the researchers which are not in the O.E. structure. For example, Accounting I, Accounting II, and Business Law all would have the same six-digit designator of 14.0102. This agency simply reported data by program area in accord with state requirements.

Student Accounting

Student accounting was based on average daily attendance (ADA). Vocational enrollments were reported by unduplicated enrollments and were available by course offering from agency records located with the vocational program director.

Five class periods per student per day was the operational definition of a full-time-equivalent student.

Since program costs were not available by program areas, the "basic" program was required to be defined as ADA in grades 1-12.

Fiscal Accounting

Fiscal reporting by the agency was based upon both objects-of-expenditure and functions by funds. Those classifications were modifications of Handbook II (1957). Expenditures could not be related to program levels (elementary and secondary) or to special areas--vocational, special education, and kindergarten. Modeling of the data was accomplished by the auditing team. Also, capital outlay data were available for fixtures and equipment, by program area based on historical costs. Table 3.7 reports the cost data by program area since only teacher salary costs were known by course level.

TABLE 3.7. SUMMARY DATA SITE C

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	1345.95	$1,594,243	$1,184	1.00
Business/O.O.	86.6	119,852	1,384	1.17
Dist. Ed.	32.8	29,643	904	0.76
Agri.	34.1	53,192	1,560	1.32
Health Occ.	-----	-----	-----	----
Home Ec.	63.25	70,914	1,121	0.95
T. & I.	89.9	141,216	1,571	1.33
Technical	-----	-----	-----	----
Other Voc. Ed. (pre-voc., indust. arts, work experience)	24.4	25,489	1,138	0.96
All Vocational	1675.	440,306	1,330	1.12

Secondary Educational Agency D

Basic Data Base

This school district was used for "basic" program data only since their vocational enrollments were served at an area vocational school. Pupil accounting was based upon average daily membership (ADM) in the secondary program (grades 9-12). Fiscal data were available by object-of-expenditure and by function. The secondary instructional costs were available by location (high school) and indirect central services were prorated. Therefore, the expenditure ratios represent the vocational program at the area vocational school and the "basic" program at a secondary school which is served by the area vocational school. However, the vocational enrollments and costs represent all secondary enrollments served and expenditures for those programs at the area vocational school.

TABLE 3.8. SUMMARY DATA SITE D

Program	FTE Enrollment	Total Cost	Cost per FTE Student	Cost Index
Basic Acad.	850.	$1,415,615	$1,665	1.00
Business/O.O.	---	-----	-----	----
Dist. Ed.	---	-----	-----	----
Agri.	101.50	245,311	2,417	1.45
Health Occ.	19.50	49,721	2,616	1.57
Home Ec.	---	-----	-----	----
T. & I.	101.50	1,264,240	2,103	1.26
Technical	12.50	89,294	7,136	4.29
Other Voc. Ed. (pre-voc., indust. arts, work experience)	---	-----	-----	----
All Vocational	735.	1,648,566	2,246	1.35

Secondary Educational Agency E

Program Data

Each vocational course in the school district was identified by title only. No attempt has been made to associate course offerings with U.S.O.E.

vocational course numbers. The auditing team was able to assign course codes at the six-digit level only; which does not discriminate sufficiently for course costing purposes. Enrollment data were reported by program area, conforming to state requirements.

Student Accounting

Student accounting was based on average daily attendance (ADA) to conform to state reporting practices although vocational enrollments were also reported on an unduplicated enrollment basis as of a state specified survey date. Agency level data also included an enrollment survey by school each semester; however, specific vocational enrollment surveys were not part of that reporting system. The vocational program coordinator made separate enrollment surveys to accommodate planning and reporting required by that office.

A full-time-equivalent student was defined as one in average-daily-attendance in five courses per day for 180 school days. Enrollment data were available by kindergarten, elementary, secondary, and handicapped students.

Enrollment data conversions were made by dividing ADA by 5 since they were reported on an annual basis. The "basic" program was defined as grades K-12 since fiscal data could not be related to program areas.

Fiscal Accounting

Direct costs of vocational instruction were available at the program area level from reports required by the state. Teacher salary and benefits data were available for proration to the course level although no other instructional costs could be directly related to courses.

The agency reported expenditures as both objects-of-expenditure and functions following Handbook II (1957). Also, most of the instructional total expenditures were reported by school level (elementary, junior high, and senior high).

Direct vocational administrative expense was provided by the program coordinator, who was assigned part-time to that role.

Capital outlay expense was available for the reporting year. Vocational equipment inventories were available at the school sites although their validity (in terms of equipment values) was deemed questionable. The year-end external audit report of the school district was most helpful in assignment of expenditures to direct and indirect cost categories.

TABLE 3.9. SUMMARY DATA SITE E

Program	FTE Enrollment	Total Cost	Cost per FTE Student	Cost Index
Basic Acad.	4849.4	$4,519,981	932	1.00
Business/O.O.	104.4	82,290	788	0.85
Dist. Ed.	4.8	5,867	1,222	1.31
Agri.	11.	34,580	3,143	3.37
Health Occ.	-----	-----	-----	----
Home Ec.	205.6	181,671	884	0.95
T. & I.	40.8	37,096	909	0.98
Technical	-----	-----	-----	----
Other Voc. Ed. (pre-voc., indust. arts, work experience)	-----	-----	-----	----
All Vocational	366.6	341,504	932	1.00

Secondary Educational Agency F

Program Data

Each vocational course in the school district was identifiable in district records by title and by U.S.O.E. six-digit code.

Student Accounting

Student accounting was based on average daily attendance (ADA) to conform to state reporting requirements. Vocational enrollments were reported by course enrollment (October survey date, and February survey date), unduplicated program area enrollments, and ADA by program area. Agency level reporting included grade-level enrollment surveys (October and February) by schools and by total special education enrollments.

Local definition of an FTE student was one enrolled in six class periods per day. For state reimbursement purposes, unduplicated program area enrollment (October and February surveys) was used.

This district could readily accommodate the cost model being tested except that "basic" enrollment would require the grades 1-12 designation since cost data are not available by program area. Also, the six class periods used to define an FTE student was seen by local vocational administrators as excessive and they agreed that five class periods was more appropriate.

Conversions required to produce FTE students by course and program area included:

$$\text{Course enrollment} \times \frac{\text{course hrs/wk}}{5} \times \frac{\text{course weeks}}{35}$$

Thirty-five was used for the academic year since the term was defined as 175 days.

Fiscal Accounting

Fiscal data for the school district were available by both object-of-expenditure and by function. The instructional function was further delineated by school level (elementary, junior high, and senior high). Special education expenditures could not be determined by grade-level groupings.

Vocational program fiscal data were limited to state reimbursement claim reports. Those reports designated expenditures by selected objects by program areas. However, not all vocational costs were claimed for reimbursement since the state allocation included a predetermined maximum. Audited expenditures exceeded the state reimbursement claim.

Teacher salary data were available from personnel records and employee benefits were prorated. Those were the only course-level direct expenditures available. Program level supplies, services and equipment expenditures were assigned by the vocational program director.

Capital outlay expenditures were available for the current year in terms of replacement equipment only.

TABLE 3.10. SUMMARY DATA SITE F

Program	FTE Enrollment	Total Cost	Cost per FTE Student	Cost Index
Basic Acad.	7,423.	$13,595,183	$1,831	1.00
Business/O.O.	158.47	243,067	1,534	0.84
Dist. Ed.	-----	-----	-----	----
Agri	-----	-----	-----	----
Health Occ.	-----	-----	-----	----
Home Ec.	87.7	161,297	1,839	1.01
T. & I.	121.5	126,103	1,038	0.57
Technical	-----	-----	-----	----
Other Voc. Ed. (pre-voc., indust. arts, work experience)	137.27	253,731	1,848	1.01
All Vocational	504.94	784,198	1,553	0.85

Secondary Educational Agency G

Program Data

Each vocational course offered by the school district was indexed with a three-digit numeric code as part of the locally generated course-index system. The audit team worked with the vocational program director to assign U.S.O.E. course codes to course titles which were identified from the school's master schedule. It was noted that many courses designated as prevocational in this school district were designated as vocational in other school districts audited.

Student Accounting

Student accounting for the district was based on average daily attendance (ADA) although vocational enrollments were based on an enrollment survey at the mid-point of each term (semesters and summer). Agency level reporting of "basic" program enrollments were by grades 7-12.

A full-time-equivalent student was defined locally as one enrolled in five courses per day for the academic year. Enrollment data conversion required for this site was:

$$\text{course enrollment} \times \frac{\text{course hrs/wk}}{5} \times \frac{\text{course weeks}}{36}$$

The "basic" program enrollment was determined by subtracting the FTE vocational enrollment from the total grades 7-12 enrollments. Special education enrollments were not available by secondary level.

Fiscal Accounting

Fiscal reporting of the school district was based on objects-of-expenditure and functions. The year-end external audit report of the district provided sufficient data for cost assignment beyond the vocational teacher salaries and benefits determined from personnel records. The "basic" secondary program expenditure per pupil was computed from the year-end audit.

Direct and indirect vocational program expenditures were established by the vocational program director although course-level expenditures could not be determined. Capital investment in instructional equipment was available at the agency level by program and depreciation values were assigned and accumulated for each item.

TABLE 3.11. SUMMARY DATA SITE G

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.			$1,191	1.00
Business/O.O.	93.4	$101,239	1,084	0.91
Dist. Ed.	5.2	4,934	949	0.80
Agri.	12.6	20,783	1,649	1.38
Health Occ.	15.6	16,522	1,059	0.89
Home Ec.	71.3	76,065	1,067	0.90
T. & I.	222.4	298,886	1,344	1.13
Technical	-----	-----	-----	----
Other Voc. Ed. (pre-voc., indust. arts, work experience)	-----	-----	-----	----
All vocational	420.5	518,429	1,233	1.04

Postsecondary Educational Agency H

Program Data

Program data at this postsecondary school were typically indexed relative to department (alpha) and two-digit course number. Vocational program personnel provided a listing which identified course, instructor, enrollment, and student contact hours for all classes taught during the target year. The auditing team translated local course designators to U.S.O.E. six-digit codes. There was much confusion about courses in the business program; i.e., which were transfer courses and which were vocational. No satisfactory resolution was made and the auditing team simply accepted the local designations that were suggested.

To conform to the O.E. class code structure a cross-over procedure could be readily adapted to the current system to produce those data. Since data are currently reported by program area and program areas are related to departments, the requisite data are readily available for those purposes.

Student Accounting

Student enrollment counts are made and reported at the end of the second week of classes during each term. For state reporting purposes, 525 student contact hours (SCH) equals 1 student in average daily attendance. Alternatively, 15 contact hours per week for 35 weeks (175 days) equals 1 full-time-equivalent student. A student contact hour at this institution does not necessarily equal a credit hour; generally, a three credit-hour course equalled 3.12 contact hours.

Since student-contact-hour was the statistic used by the institution for both transfer and vocational programs, that measure of full-time-equivalency student was utilized for the purposes of this study.

Fiscal Accounting

Fiscal reporting of the agency was based on objects-of-expenditure by function. Vocational program cost accounting was limited to the typical department level assignment of expenditures. State reimbursement claims for vocational offerings were esoteric reports, reflecting only a portion of the total expenditures incurred as a result of vocational activities.

Teacher assignment information was available from class listings and their salaries were available from payroll records; employee benefits were prorated. Although expenditure data were not available for supplies, materials, and purchased services by course, those expenditures were available by department which could then be related to program area. Vocational program personnel assisted in assigning both direct and indirect vocational expenditures to the program area level.

Capital outlay expenditures were available for equipment purchases only. A recent purchase of a sophisticated electron microscope utilized in the health and technical program areas demonstrates the dangers of assigning initial capital costs at the time of purchase. The already high student cost of health occupations would have been reported about 20 percent higher for that year had that one item of equipment been included in current expenditures.

Program level expenditure accounting was readily accommodated by the test model at this site. Course-level expenditures were limited to direct assignment of teacher's salaries and proration of other costs. The "basic" program, instructional expenditures, was limited to total instruction minus vocational instruction determined by audit.

TABLE 3.12. SUMMARY DATA SITE H

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	9,164.4	$7,188,747	$ 784	1.00
Business/O.O.	577.2	892,112	1,546	1.97
Dist. Ed.	232.3	285,429	1,229	1.57
Agri.	159.5	508,127	2,559	3.26
Health Occ.	235.8	1,003,609	4,256	5.43
Home Ec.	116.0	163,633	1,411	1.80
T. & I.	261.1	678,091	2,597	3.31
Technical	435.5	774,310	1,778	2.27
Other Voc. Ed. (pre-voc., indust. arts, work experience)	55.2	52,487	951	1.21
All Vocational	2,072.6	$4,257,798	$2,054	2.62

Postsecondary Educational Agency I

Program Data

Each course offered at this postsecondary school was indexed by department and as a three-digit course number. Vocational personnel provided a listing of all courses taught, by school term. However, the listings were by course title and therefore site auditors were required to assign U.S.O.E. course numbers. Vocational courses taught by part-time personnel were also determined from vocational division reports.

To conform to the O.E. course numbering system would require either restructuring the course numbering system or development of a cross-over procedure to produce those data. Given the educational mission of the institution, the latter would seem to be the preferred alternative. The program data were readily available and easily translated for modeling purposes.

Student Accounting

Student enrollment counts are made during the third week of each term, except that enrollment counts are made at the end of the first week of the summer term.

The "basic" academic full-time-equivalent student was defined as 15 credits for each semester (30 credits per academic year) and 6 credits for the summer term. A full-time vocational student was defined as 30 contact hours per week times 16 weeks or 20 contact hours as 1 credit hour per semester. Given that vocational enrollment reports included both full-time headcounts and full-time contact hours by terms, by courses, the FTE student enrollments were readily determined.

Fiscal Accounting

The postsecondary institution had implemented a program budgeting structure which tracked expenditures to program areas--including the vocational program areas which were the subject of this study. Teacher salary data were available from personnel records (full-time) and board minutes (part-time) for assignment to courses. A large number of student contact hours were produced by part-time staff, especially in the business and technical programs.

Assignment of expenditures to program areas was readily accommodated due to the normative practices of the organization. Course level assignment of expenditures was limited to salaries and benefits (prorated percentages) and given the large part-time faculty, the latter was the major auditing task at this site.

Prorations of direct and indirect vocational program administrative costs were identified by vocational administrative personnel.

Capital outlay data were available for current year equipment purchases. An inventory of all capital items was available in the vocational division.

TABLE 3.13. SUMMARY DATA SITE I

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	1281.	$1,629,479	$1,272	1.00
Business/O. O.	47.61	193,757	4,070	3.20
Dist. Ed.	29.36	98,573	3,355	2.64
Agri.	65.78	246,438	3,746	2.94
Health Occ.	28.89	83,672	2,896	2.28
R. N.	81.35	343,957	4,228	3.32
Home Ec.	19.38	71,868	3,708	2.92
T. & I.	219.09	607,850	2,774	2.18
Technical	24.77	44,872	1,812	1.42
Other Voc. Ed. (pre-voc., indust. arts, work experience)	52.46	260,285	4,962	3.90
All Vocational	568.69	$1,951,272	$3,431	2.69

Postsecondary Educational Agency J

Program Data

Each course at this postsecondary institution was identified by a 9 digit alpha-numeric designator. The institution has established the Higher Education General Information System (HEGIS); therefore U.S.O.E. course numbering would best be facilitated through a cross-over procedure. Site auditors assigned O.E. course numbers to listings provided.

Student Accounting

The method of student accounting was full-time-equivalent defined as 15 credit hours per semester. Third week enrollment counts served as the basis for determining full-time-equivalent students $\left(\frac{\text{Course Enrollment} \ \text{X} \ \text{Course Credit}}{30}\right)$. The same basis was used to compute the "basic" program.

Student accounting data were reported for each course as part of the HEGIS Unit Cost Report. Only FTE computations were required by the site auditors.

Fiscal Accounting

Instructor salaries were prorated by course as were noninstructional costs as part of the normative fiscal accounting practice of the organization. Vocational administrative personnel assisted in the assignment of direct and indirect vocational administrative costs to program areas. External year-end audit reports assisted in costing the basic program.

Capital outlay data were available by program areas for current equipment expense and an inventory of all equipment purchased was maintained by building, room and department assignment. The inventory included purchase date and amount of purchase.

The data at this site readily accommodated the test model. Minimal data processing subroutines would be required to produce the added-costs by courses and by program areas.

TABLE 3.14. SUMMARY DATA SITE J

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	8,164.6	$6,331,580	$ 775	1.00
Business/O. O.	2,510.5	1,571,422	626	0.81
Dist. Ed.	663.4	355,152	535	0.69
Agri.	141.2	103,746	735	0.95
Health Occ.	1,574.2	2,525,615	1,604	2.07
Home Ec.	263.5	213,845	812	1.05
T. & I.	2,552.6	1,742,841	683	0.88
Technical	388.8	539,272	1,387	1.79
Other Voc. Ed. (pre-voc., indust. arts, work experience)	------	-------	-----	----
All Vocational	8,094.2	$7,051,802	$ 871	1.12

Postsecondary Educational Agency K

Program Data

Course numbering at this postsecondary school consisted of departmental alpha-numeric designators. The use of the Higher Education Information System was not fully developed although a cross-over routine could be adopted to produce U.S.O.E. course codes. Site auditors were required to assign O.E. course numbers by course titles. However, specificity was such that adequate course discriminations could not be made.

Student Accounting

Student enrollment counts were made on the basis of student contact hours designated for each course times the enrollment survey at the end of the second week of classes each term. A full-time-equivalent student was defined as 24 credit hours per academic year. The following formula was utilized to compute

FTE students in each vocational course and thereby develop student contact hours as the basis of student accounting:

$$\frac{\text{enrollment} \;\; X \;\; \text{course hrs/wk} \;\; X \;\; \text{course wks}}{900}$$

Fiscal Accounting

Fiscal data were available by objects-of-expenditure and by function. Teacher salary data were available from personnel records and fringe benefits were assigned on a percentage basis. Vocational administrative personnel assigned direct and indirect vocational administrative costs to program areas. Supplies, purchased services, and other objects-of-expenditure could not be related to vocational courses but could be related to program areas on a departmental basis. Current year purchases of equipment were also reported by departmental level. A large number of vocational courses were taught through the Community Education Program by part-time staff. Site auditors included those expenses and enrollments as vocational expenditures (that process was done at each site; experience at this agency assisted in developing auditing techniques for making those assignments).

TABLE 3.15. SUMMARY DATA SITE K

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	366	$971,661	$2,655	1.00
Business/O.O.	327	517,797	1,583	0.60
Dist. Ed.	------	-------	------	----
Agri.	301	316,935	1,053	0.40
Health Occ.	90	245,742	2,730	1.03
Home Ec.	------	-------	-----	----
T. & I.	1,113	1,591,150	1,430	0.54
Technical	300	691,575	2,305	0.87
Other Voc. Ed. (pre-voc., indust. arts, work experience)	------	------	-----	----
All Vocational	2,131	$3,363,199	$1,578	0.59

Postsecondary Educational Agency L

Program Data

Course numbers at this postsecondary site were typically alpha-numeric. Course titles were used to translate identifers to U.S.O.E. course numbers. A cross-over procedure could be readily adapted to produce course listings by vocational program area and O.E. numbers since they are currently organized by vocational departments consistent with the seven vocational program areas. The vocational education division operates as an administrative subunit of the organization and is therefore constrained in its format of course listings. Like other postsecondary institutions visited however, this vocational division does prepare separately formated reports for state vocational reporting purposes. It is the latter reports that facilitated site auditor's data gathering efforts.

Student Accounting

The "basic" program definition of a full-time-equivalent student was 15 credit hours per semester or 30 credit hours per academic year. Six semester hours credit represented a full-time summer enrollment. The vocational division established a different measure of full-time-equivalency. Course enrollments were surveyed at the end of the second week of instruction (end of the first week for "short" courses) and reported student contact hours per week. The following computations were made to quantify the full-time-equivalancy enrollment for vocational courses:

$$\frac{\text{enrollment X } \overset{\text{term}}{\text{weeks}} \text{ X } \overset{\text{course}}{\text{Hrs./wk.}}}{900}$$

Obviously, like other postsecondary institutions instructional contact hours in some courses exceeded the 900 contact hours standard: and, some "short" courses were less. However, the standard 900 was used for purposes of uniformity in data analysis.

Fiscal Accounting

The vocational division was budgeted and expenditures recorded as a subunit of the institution. Therefore direct and indirect vocational costs could be readily audited to program areas. Within the vocational divisions, expenditures for supplies and materials were tracked to program areas but not to courses. Course-level expenditures were limited to FTE portions of actual teacher salaries and a proration of average fringe benefits. Vocational staff assisted in prorating administrative and support personnel time by program areas. Capital outlay expenditures were not available by program areas. Interestingly, millions of dollars of equipment had been donated to this institution's technical program in past years.

Objects-of-expenditures were the basis of fiscal accounting at this institution. The structure represented a locally developed structure.

TABLE 3.16. SUMMARY DATA SITE L

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	4,450	$18,456,072	$4,147	1.00
Business/O.O	186	729,950	3,924	0.95
Dist. Ed.	55	237,431	4,317	1.04
Agri.	33	101,776	3,084	0.74
Health Occ.	36	132,778	3,688	0.89
Home Ec.	2	6,744	3,372	0.81
T. & I.	664	2,918,603	4,395	1.06
Technical	256	1,364,769	5,331	1.29
Other Voc. Ed. (pre-voc., indust. arts, work experience)	27	58,994	2,185	0.53
All Vocational	1,259	$5,551,045	$4,409	1.06

Postsecondary Educational Agency M

Program Data

Course numbering at this postsecondary site consisted of alpha-numeric designators by department. Vocational courses were identified by title, and site auditors assigned U.S.O.E. course codes with the assistance of local vocational personnel. Like other postsecondary sites, O.E. course discriminators were not satisfactory to create discrete course designators. A computer-based cross-over procedure could be readily adapted to prepare course reports by O.E. course numbers although more discrimination is needed to accommodate local offerings.

Student Accounting

Student accounting data were reported by average daily attendance (ADA), student credit hours, and student contact hours by course level. Full-time-equivalent student was defined as (a) weekly student contact hours divided by 15 or (b) credit hours divided by 15 (30 on an academic year basis). The local conversion to ADA was determined by multiplying (a) by a factor of 0.922 for state reporting purposes. For purposes of this project the standard definition of 1 FTE = 900 contact hours was used.

Fiscal Accounting

Fiscal data were available by a locally developed classification system including fund, object, organization/program, activity, and site. Teacher's salaries and benefits were available by department and site auditor's assigned those to courses as a function of the individual teacher's assignment. Supplies and materials, purchased services, and other expenditures were available at the department level only and therefore require proration to courses if deemed desirable.

The state-aid claims for vocational programs had little relationship to the audited program costs since those were esoteric reports prepared to claim a predetermined reimbursement amount. Capital outlay expenditures were limited to current year equipment purchases and no known equipment register was available.

The fiscal data base at this site was adequate for added-cost modeling at the vocational program area level and could be accomplished within the current data processing scheme with minor adaptations. The impression of site auditors was that more data were available than were being utilized for management purposes.

TABLE 3.17. SUMMARY DATA SITE M

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	2,136	$3,102,858	$1,453	1.00
Business/O.O.	541	488,443	903	0.62
Dist. Ed.	83	117,435	1,415	0.97
Agri.	136	203,960	1,500	1.03
Health Occ.	99	276,611	2,794	1.92
Home Ec.	120	111,677	931	0.64
T. & I.	291	263,457	905	0.62
Technical	322	256,980	793	0.55
Other Voc. Ed. (pre-voc., indust. arts, work experience)	85	195,954	2,305	1.58
All Vocational	1,677	$1,914,517	$1,142	0.79

Postsecondary Educational Agency N

Program Data

The program structure at this postsecondary institution was similar to other postsecondary schools in that data were organized by departments and vocational departments related to U.S.O.E. vocational program areas. Course numbering was characteristically alpha-numeric for student registration purposes although a cross-over sub-routine translated those designators into a four-digit numeric code for cost reporting purposes (HEGIS adaptation). The four-digit course codes did not relate to U.S.O.E. vocational course codes but a simple adaptation would accommodate that structure. Site auditors made those translations for purposes of this project.

Student Accounting

Student accounting was reported on two bases. For state purposes an enrollment survey was taken at the mid-point of each term while for school statistical purposes an enrollment survey was taken during the second week of classes. For purposes of this study student contact hours were computed as follows to determine full-time vocational enrollments:

$$\frac{\text{course enrollment} \times \begin{matrix}\text{course}\\ \text{weeks}\end{matrix} \times \begin{matrix}\text{course}\\ \text{hrs./wk.}\end{matrix}}{900}$$

The institution defined an FTE student as "one enrolled for 12 or more semester hours during a semester term (24 for the academic year) and 6 or more semester hours for the summer term." However, for the purposes of this project 30 semester hours become the criterion for determining a full-time-equivalent student enrolled in the basic program.

Fiscal Accounting

Program accounting by department by course was normative practice at this institution. The unit cost report included student credit hours, FTE faculty load, prorated direct faculty salaries, direct department costs, and "allocated" costs. The latter were based on student enrollments and were divided as operations and maintenance and costs other than operations and maintenance. Also, a "building rental" proration was made based upon space utilization.

Departmental level expenditure reports included an object-of-expenditure classification consistent with the target categories of this project.

TABLE 3.18. SUMMARY DATA SITE N

Program	FTE Enrollment	Total Cost	Cost Per FTE Student	Cost Index
Basic Acad.	4,465.2	$4,128,245	$ 925	1.00
Business/O.O.	642.6	665,263	1,035	1.12
Dist. Ed.	178.3	140,365	787	0.85
Agri.	6.2	4,614	744	0.80
Health Occ.	178.9	293,359	1,640	1.77
Home Ec.	34.4	19,656	571	0.62
T. & I.	302.5	497,075	1,643	1.78
Technical	197.8	194,998	985	1.07
Other Voc. Ed. (pre-voc., indust. arts, work experience)	1.6	-----	----	----
All Vocational	1,542.3	$1,815,330	$1,177	1.27

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CHAPTER 4

THE ADDED-COST MODEL FOR VOCATIONAL EDUCATION

Introduction

The development and testing of various conceptualizations of integrating alternative data sets that would accommodate the data characteristics and processes described in Chapter 1 of this Report, provided the sinew for all other project activities. Those planned activities had as their focus a User Manual for determining the "added-cost" of vocational-technical programs and courses offered in public secondary and postsecondary institutions. This chapter offers a brief review of the modeling process and then presents the complete "added-cost" model which is also contained in a separate document as the User Manual.

The Modeling Process

The initial conceptualization of the data set was seen as forming three primary dimensions--vocational program areas and a designated "basic" program, data sets of interest (enrollment and expenditures), and organizational units. Each of those primary dimensions was examined relative to the literature review cited in Chapter 2 of this Report to establish relevant levels of data aggregation or disaggregation. Since the unit of analysis becomes the point at which data dimensioning terminates, the choice of those units are delimiting decisions. For example, organizationally, the educational agency (school district or postsecondary institution) is one level of analysis. Below that level are schools and departments and above that level are groups of agencies (educational planning districts, cooperatives, etc.) and state agencies. The decision to limit the unit of analysis to agency-level thereby aggregates data such that data analysis at the lower dimensions is confounded. However, the decision may be one of necessity for various reasons, e.g., data of interest may not be available at the department or school levels. Since the process is similar for each of the primary dimensions, the guiding principle for this activity is one which assesses each level of analysis in terms of its practicability; i.e., an assessment is made as to: (1) are desired data elements available in the form required, (2) what is lost by disaggregating or aggregating existing data at that particular level, and (3) what are the costs of the processes necessary to acquire those data elements?

Once the primary dimensions have been arrayed, the next step in modeling is to integrate the data sets and then repeat the assessment process. An example of sample assessment questions will be used to illustrate the process. Assume that the course level is chosen as the unit of analysis for the vocational program dimension. The assessment process requires that we know the following about that course offering for each data dimension:

Program Area

(1) Does the course have an O.E. vocational number?

  (a) Is that number unique to that course?

(2) Is more than one section offered?

(3) How many student contact hours per week does the course meet?

(4) What is the term of the course?

(5) Are there collateral activities related to the course?

Organizational Units

(1) Is the course offered in other schools/departments of the educational agency?

(2) Is the course a cooperative offering such that the agency shares costs with another agency?

  (a) Who counts the enrollments?

  (b) How are costs shared?

Data Elements

Enrollment

(1) How are student counts determined (ADM, FTE, etc.)?

(2) May they be converted to FTE and maintain reasonable accuracy?

(3) At what organizational level are course enrollments maintained (department, school, etc.)?

(4) What is the definition of a full-time student in the "basic" program?

Fiscal

(1) Are expenditure data maintained by course as a normative accounting practice of the agency?

(2) What organizational unit is the unit of analysis used in the agency's accounting practice?

(3) Must an extensive audit be made to relate objects-of-expenditure to the course?

(4) Assess the extent of data aggregation/disaggregation required to relate objects-of-expenditure to the course for each offering by section and by term.

(5) May the costs of cooperative offerings be prorated to each cooperating agency on the basis of FTE enrollment?

(6) May both capital outlay expense and space-used be determined?

  (a) Are they constants for each offering of the course?

In addition to the above sample of questions relative to the particular vocational course offering, one must further determine the unit of analysis for the "basic" program. For example, does one relate vocational program costs to grades 1-12, 7-12, 9-12 or some other combination at the secondary level or to liberal arts, transfer, or other combination at the post-secondary level? Irrespective of propensity, data sufficiency and efficiency are the cirtical concerns; i.e., unless the data are available or readily translated relative to the unit of analysis selected, one may be forced to utilize an alternative, less desirable, unit of analysis. Such was the case in this project.

The model that follows is the result of the literature review, modeling processes, field-tests, and panel reviews. The design is such that electronic data processing is not required to yield the desired results of occupational program area costs and their relationships to the "basic" program costs and determination of course costs. However, a prototype electronic data processing coding structure has been defined for local/state adaptations since it is recognized that many educational agencies have already established computer-based systems of student and fiscal accounting; yet, they may not be directed toward added-cost analysis. Therefore, the procedures suggested may contribute to all agencies irrespective of their state-of-the-art in developing management analysis techniques and reporting systems.

A MODEL FOR DETERMINING THE ADDED COSTS
OF VOCATIONAL-TECHNICAL EDUCATION

INTRODUCTION

This User Manual is designated to assist management personnel in secondary school districts and postsecondary institutions in their cost analyses of vocational programs and courses. The manual is organized such that an overall conceptualization of the model is presented and each dimension is briefly described. The data elements are organized into data collection instruments and recommended procedures and data elements are described for both the "basic" programs and for vocational program areas and courses. One product of the cost analysis activity is the determination of vocational program area costs in relationship to the "basic" program costs. Another product is individual occupational course costs.

The Appendices contain sample data classifications for use with year-end fiscal reports of secondary school districts and postsecondary institutions. Also, the sources of definitions used for student and fiscal data elements, organizational units, and program areas are given and selected definitions are provided.

Our field-tests highlighted the need to classify separately the agency-level data of secondary school districts and postsecondary institutions. Therefore, we have included two B-1 forms, one for secondary school districts and one for postsecondary institutions. The various vocational-technical data instruments should serve both types of institutions adequately for these purposes. However, local adaptation is encouraged to extend their usefulness in the pursuit of program management excellence.

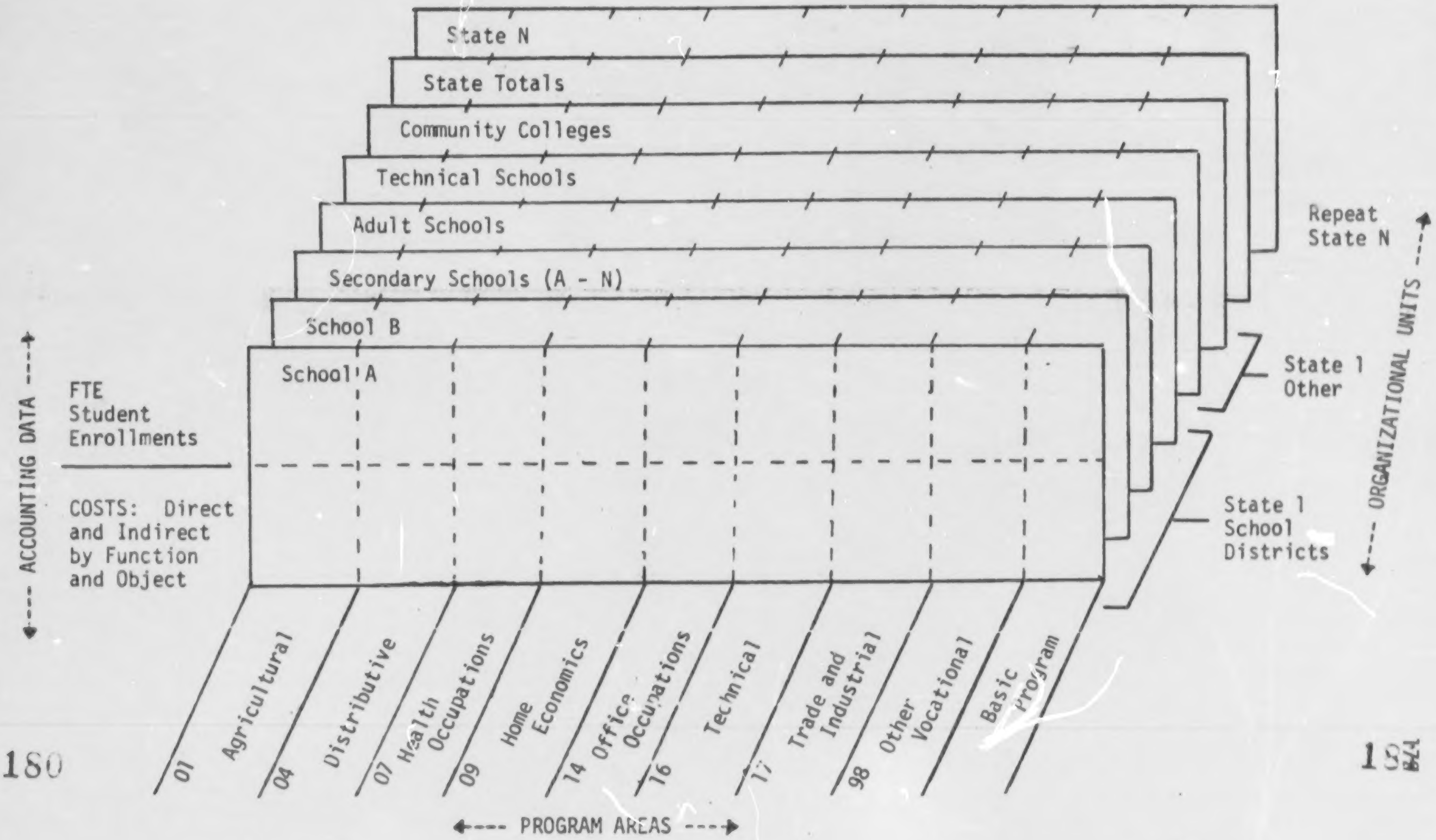
Conceptualization of the Added-Cost Model

Figure 1 represents a crosswalk of the model design. Each dimension of the model will be addressed in turn, Organizational Units, Instructional Programs, and Accounting Data Elements.

The Organizational Units dimension of the model identifies each operating unit that invests resources in support of vocational education programs. The purpose of this dimension of the model is to establish responsibility/cost centers; locations at which program activities occur and therefore resources are demanded. The responsibility center (classroom, school, management office, etc.) may or may not be a cost-center, a term associated with the accounting structure of the organization. The national trend is to aggregate expenditures at school or department locations and at various service locations (business manager's office, transportation manager's office, etc.).

For modeling purposes one would seem to gain little by aggregating course costs by both middle/junior high schools and high schools for two reasons. Firstly, middle/junior high school vocational program offerings are few and/or non-existent. Secondly, many school districts operate secondary schools encompassing grades 7-12. One should, however, include the costs of any vocational course operating at middle/junior high schools but simply designate them as secondary schools. Likewise, there is little gain in an added-cost model for a particular program to dimension central

COST OF VOCATIONAL EDUCATION MODEL CROSSWALK


State N
State Totals
Community Colleges
Technical Schools
Adult Schools
Secondary Schools (A - N)
School B
School A
Repeat State N
State 1 Other
State 1 School Districts
ORGANIZATIONAL UNITS
ACCOUNTING DATA
FTE Student Enrollments
COSTS: Direct and Indirect by Function and Object
01 Agricultural
04 Distributive
07 Health Occupations
09 Home Economics
14 Office Occupations
16 Technical
17 Trade and Industrial
98 Other Vocational
Basic program
PROGRAM AREAS

services (management, transportation, etc.) and therefore those costs should be attributed to program areas. It is important, however, to distinguish between the secondary vocational programs and the adult vocational programs for analysis of added costs. The organizational units for purposes of added-cost modeling therefore, become secondary schools and adult at the school district level. At the postsecondary level, the organizational units used for cost aggregation are technical schools and community colleges. Hierarchically, the organizational unit relationships are:

Secondary Schools
Adult Schools
School Districts

Technical Schools
Community Colleges
Postsecondary

Course cost data or program area cost data, as the units of analyses, will be available by each of the four basic organizational units as well as by summaries of school districts and postsecondary institutions.

Definitions of the organizational units used in the model are as follows:

Secondary School - a school comprising any span of grades beginning with the next grade following an elementary or middle/junior high school and ending with or below grade 12.

Adult School - a school for adults and youths who are pursuing skills or knowledge at times or places or schedules other than the regular secondary and postsecondary programs.

Technical School - a postsecondary school specializing in occupational programs for adults and out-of-school youth and/or shared programs for youth enrolled in secondary schools.

Community Colleges - an institution of higher education which usually offers the first 2 years of college instruction and occupational programs but less than a bachelor's degree.

School District - a local educational agency that provides instructional programs for youth primarily and for adults. For purposes of cost aggregation, an intermediate educational agency which provides vocational programs may be classified as a school district.

Postsecondary - institutions offering educational programs beyond secondary school.

The program dimension of the model consists of those course offerings in the various vocational education areas and the "basic" education program. The program areas are described in the appendices. Course definitions and coding structures are those recorded in U.S.O.E. Handbook VI. Due to the overlapping of course titles and codes, it is recommended that educational agencies extend the OE code structure beyond the suggested two-digit designators given in Handbook VI to accommodate local needs. That was the purpose in providing the extra digits in the structure design. Investigations have demonstrated clearly the need for those extensions if accurate course level costs are desirable from the model.

The accounting data dimension of the model consists of student enrollments and expenditures. Form V/T-1 is designated to capture student enrollments in vocational courses by student contact hours. However, since many states and postsecondary institutions have developed sophisticated systems of student accounting, the model is not dependent upon completion of V/T-1. Definitions of student accounting are given in the appendices along with definitions of the various cost elements of each data instrument.

The accounting data requisite to exercising the model represent enrollment and cost data related to programs (basic and vocational). Some data are generated at the course level while other data are captured at the agency level. In the latter case, those data are attributed to programs (program areas) on the basis of either students or teachers.

B-1 BASIC PROGRAM COSTS AND INDIRECT COSTS ATTRIBUTION

Introduction

Due to differences in functional categories of expenditure accounting between secondary and postsecondary educational agencies, the analyses of agency-level fiscal reports of the two types of agencies are illustrated separately. Although year-end reports of secondary school districts vary among states and year-end reports of postsecondary institutions vary among states, the within group variances are not as great as are the between group variances. The instructions for preparation of agency-level data apply to both types of agencies. However, specific (detailed) instructions are separated into directions for each type of agency by using the sample data classifications of each contained in the appendices.

Recommended Procedures

Step 1 - Determine the number of full-time-equivalent (FTE) students in all agency programs.

Step 2 - Determine total number of FTE teachers serving all agency programs.

Step 3 - Classify agency expenditures, less capital outlay, by attribution base (students or staff).

Step 4 - Determine "basic" program expenditures and vocational program expenditures.*

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*Note: If vocational program expenditures are not available from agency-level reports, then they must be determined through use of V/T-1 thru V/T-4 before "basic" program expenditures may be determined. Alternatively, B-1 may be completed in conjunction with form V/T-5.

Instructions for Completing B-1

Two types of data are necessary to determine the comparative "basic" program costs and to attribute indirect costs to vocational education programs and courses--student enrollment data and expenditure data.

Student enrollments for the fiscal year must be secured. If the fiscal year report encompasses portions of summer terms at both the beginning and the ending of the reporting period, those enrollments must be adjusted to include only the portion of time enrolled for the fiscal period. The most desirable method of student accounting is the full-time-equivalent (FTE) since vocational program enrollment will be based upon that method (student contact hours : 900). Alternatively, if the agency uses one or more enrollment surveys during the year, use the average of those counts or average-daily-membership (ADM) if that method is used. If average-daily-attendance (ADA) is the standard method of student accounting, convert it to ADM or FTE. Finally, if credit hour counts form the only basis for student accounting, as is the case for some postsecondary institutions, then determine full-time-equivalent students by dividing total credit hours by thirty (total credit hours : 30) for the academic year and then add the credit hours for the appropriate portions of the summer term(s) divided by nine (9). However, care must be taken to include noncredit enrollments on an equivalent basis. For example, if a noncredit 6 weeks course of instructions is offered, then those enrollments should be converted to full-time-equivalent enrollments irrespective of the method of student accounting used or level of agency instructional programs. The general rule is:

> If the agency costs are reflected in the year-end financial report, then claim the full-time-equivalent students served; or if there is an inter-agency sharing of costs, then claim the student counts in the same proportions as the costs are shared.

BASIC PROGRAM COSTS AND INDIRECT COSTS ATTRIBUTION

SECONDARY SCHOOL AGENCY

BASIC PROGRAM

1. Total Agency FTE Enrollment ______
2. Less: V/T FTE Enrollment (Σ item #5, V/T-2) ______
3. Basic Program FTE Enrollment (item #1 minus item #2) ______
4. Total FTE Teachers ______
5. Less: V/T FTE Teachers (Σ item #4, V/T-2) ______
6. Basic Program FTE Teachers ______

ACCOUNT 1000 INSTRUCTION

7. Total ______
8. Less V/T (Σ item #15, V/T-5) ______
9. Total Basic (item #7 minus item #8) ______

C. Basic Program Cost/Student (item #9 ÷ item #3) ______

1. Indirect Student Base (item #32) ______

2. Indirect Teacher Base $\left(\frac{\text{item \#33 x item \#5}}{\text{item \#3}}\right)$ ______

3. Total Basic Cost/Student (Σ items #10, #11, and #12) ______

	ACCOUNT*	PURPOSE (less C/O)		COST ATTRIBUTION BASE	
				STUDENT	TEACHER
14.	2100	Student Support Services		$______	$
15.	2200	Instructional Support Services		______	
16.	2300	General Administration			______
17.	2400	School Administration			______
18.	2550	Transportation	______		
19.	Less:	Direct V/T Trans.	______	______	
20.	2560	Food Services		______	
21.	All Other 2500				______
22.	2600	Central Services			______
23.	2700	Other Regular			______
24.	3000	Community Services	______		
25.	4000	Nonprogrammed Charges	______		
26.	5000	Debt Services	______		
		TOTALS		30.$______	31.$______

32. Attribution Per Student (item #30 ÷ item #1) $______

33. Attribution Per Teacher (item #31 ÷ item #4) $______

*See classification example in appendix.

BASIC PROGRAM COSTS AND INDIRECT COSTS ATTRIBUTION

POSTSECONDARY SCHOOL AGENCY

BASIC PROGRAM

1. Total Agency FTE Enrollment ________
2. Less: V/T FTE Enrollment (Σ item #5, V/T-2) ________
3. Basic Program FTE Enrollment (item #1 minus item #2) ________
4. Total FTE Teachers ________
5. Less: V/T FTE Teachers (Σ item #4, V/T-2) ________
6. Basic Program FTE Teachers (item #4 minus item #5) ________

ACCOUNT 1.000 INSTRUCTION

7. Total ________
8. Less: V/T (Σ item #15, V/T-5) ________
9. Total Basic (item #7 minus item #8) ________

10. Basic Program Cost/Student (item #9 ÷ item #3) ________
11. Indirect Student Base (item #32) ________
12. Indirect Teacher Base $\left(\frac{\text{item \#33} \times \text{item \#6}}{\text{item \#3}}\right)$ ________
13. Total Basic Cost/Student (Σ items #10, #11, and #12) ________

	ACCOUNT*	PURPOSE (less C/O)	COST ATTRIBUTION BASE	
			STUDENT	TEACHER
14.	4.100	Libraries		
15.	4.200	Museums and Galleries	$________	$
16.	4.300	Audio/visual Services	________	
17.	4.400	Computing Support	________	
18.	4.500	Ancillary Support	________	
19.	4.600	Academic Administration	________	
20.	4.700	Curriculum Development		________
21.	4.800	Academic Personnel Development		________
22.	5.000	Student Services		________
23.	6.000	Institutional Support	________	
24.	7.550	Auxiliary - Students		________
25.	7.560	Auxiliary - Athletics	________	
26.	7.660	Auxiliary - Faculty/Staff	________	
				________
		TOTALS	30. $________	31. $________

32. Attribution Per Student (item #30 ÷ item #1) $________

33. Attribution per teacher (item #31 ÷ item #4) $________

*See classification example in appendix.

The year-end financial statement of expenditures must be divided into accounts or functions by attribution base--a section for attribution by students and a section for attribution by teachers. These sections should be further classified as agency level and as program level ("basic" and vocational) if the agency data is so organized. However, the procedure that follows assumes that expenditure data for vocational instruction are not evident from the year-end financial report or supporting documents at the agency level. If the latter is the case, then the second classification is not necessary since agency data are to be classified as program-level.

Two examples of data classification are provided in the appendices: an example of a public school district data classification and an example of postsecondary (college level) data classification.

Detailed Instructions for Completing B-1
(Secondary School Agency)

Item Number	Item Name	Description*
01	FTE Enrollment	Enter the total full-time-equivalent enrollment in all programs of the agency (see Instructions for Completing B-1).
02	V/T FTE Enrollment	Enter the full-time-equivalent enrollment in all vocational programs; sum of item #06, V/T-2.
03	Basic Program Enrollment	Enter difference of item #01 and item #02.
04	FTE Teachers	Enter the total number of full-time-equivalent teachers in all programs of the agency.
05	V/T FTE Teachers	Enter the total number of full-time-equivalent teachers in all vocational programs, sum of item #05, V/T-2.
06	Basic Program FTE Teachers	Enter difference of item #04 and item #05.
07	Total Account 1000	Enter total expenditures reported in the Instruction account.

Item Number	Item Name	Description*
08	V/T Account 1000	Enter total expenditures determined for vocational programs; sum item #15, V/T-5.
09	Basic Account 1000	Enter difference of item #07 and item #08.
10	Basic Cost/ Student	Enter quotient of item #09 and item #03.

COMPLETE ITEMS #14 THROUGH ITEM #33 BEFORE ITEMS #11 THROUGH #13

Item Number	Item Name	Description*
11	Indirect Student Base/Student	Enter item #32.
12	Indirect Teacher Base/Student	Enter (item #33 times item #06) ÷ item #03.
13	Total Basic Program/Cost Student	Enter sum of items #10, #11, and #12.
14	Student Support Services	Attribute costs of student support to students.
15	Instructional Support Services	Attribute costs of instructional support to students.
16	General Administration	Attribute costs of general administration to teachers.
17	School Administration	Attribute costs of school administration to teachers.
18	Transportation	Enter total expenditures for transportation services.
19	V/T Transportation	Enter total expenditures for vocational program transportation, if known and included on V/T-4. Find difference of total expenditures for transportation and known expenditures for vocational transportation. Attribute difference to students.
20	Food Service	Enter agency expenditures for food service. Attribute to students.

Item Number	Item Name	Description*
21	Other 2500	Enter amount expended for business services (2500) less transportation and food services. Attribute to teachers.
22	Central Services	Attribute to teachers.
23	Other Regular	Attribute to teachers.
24-26	THESE EXPENDITURES ARE NOT TO BE ATTRIBUTED TO PROGRAMS	
27-29	SPACE PROVIDED FOR LOCAL ADAPTATION	
30	Total Student Attribution	Sum column - student attribution base.
31	Total Teacher Attribution	Sum column - teacher attribution base.
32	Attribution/ Student	Enter the quotient of item #30 and item #01.
33	Attribution/ Teacher	Enter the quotient of item #31 and item #04.

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*Note: See definitions in appendix.

Detailed Instructions for Completing B-1
(Postsecondary School Agency)

Item Number	Item Number	Description*
1-13	SAME AS SECONDARY SCHOOL AGENCY	
14	Libraries	Enter amount expended for libraries; attribute to students.
15	Museums & Gallaries	Enter amounts expended for museums and gallaries; attribute to students.
16	A/V Services	Enter amounts expended for audio-visual services; attribute to students.
17	Computing Support	Enter amounts expended for computing support relative to instruction; attribute to students.
18	Ancillary Support	Enter amounts expended for ancillary services; attribute to students.
19	Academic Administration	Enter amounts expended for academic administration; attribute to teachers.
20	Curriculum Development	Enter amounts expended for curriculum development; attribute to teachers.
21	Academic Personnel Development	Enter amount expended for academic personnel development; attribute to teachers.
22	Student Services	Enter amount expended for student services; attribute to students.
23	Institutional Support	Enter amount expended for institutional support; attribute to teachers.
24	Auxiliary Students	Enter amount expended from agency funds for auxiliary student services; attribute to students.
25	Auxiliary Athletics	Enter amount expended from agency funds for athletics; attribute to students.
26	Auxiliary Faculty/Staff	Enter amount expended from agency funds for auxiliary services for faculty and staff; attribute to teachers.
27-29	SPACE PROVIDED FOR LOCAL ADAPTATION	
30-33	SAME AS SECONDARY SCHOOL AGENCY.	

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*Note: See definitions in appendix.

V/T-1 VOCATIONAL-TECHNICAL COURSE DATA

Introduction

The general purpose of Form V/T-1 is to obtain a class record for each course. All or part of the necessary information may be generated from other information files maintained by the organization. For example, instructor number, name, load, etc., may be included in the personnel and/or other school (department) record(s). Also, the student data requested may be contained in the student enrollment files. With regard to the latter, only the sum of student hours is used for course cost accounting purposes. Other student requested data simply facilitate program analyses for local, state, and federal planning and reporting; not cost analysis.

The instructions that follow assume that no interface exists between other computer-based files for this purpose and that all information must, therefore, be supplied by the instructor and/or their supervisor. Additional space is provided in the input format to allow for expansion of this record to meet local needs (see keypunching instructions). For example, it may be desirable to identify cooperative education courses in this record.

Recommended Procedures

Step 1 - Each instructor will receive an adequate supply of V/T-1 forms and and an instruction manual. A form shall be completed for each class taught by each instructor.

Step 2 - At the beginning of each class, the instructor shall complete the top section* of the form and enter student data items 21-26, and 30. Additional students should be added to the report as they become members of the class.

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*Note: As an alternative, the appropriate supervisor may complete data items 1-13_{ff}. prior to distribution of forms to instructors.

Step 3 - When a student terminates membership in a class prior to the end of the class term, the instructor should complete items 27-29 for that student at the time of termination.

Step 4 - At the end of the class term, or June 30, if course instruction extends beyond June 30, all data items shall be completed and audited for accuracy and legibility by the instructor.

Step 5 - The instructor shall forward all forms for each class to the director of vocational education or other appropriate supervisor. (It is recommended that the forms be in two or three part carbons so that a copy may be retained by the instructor and/or supervisor.)

Step 6 - The appropriate supervisor shall audit all forms for completeness and general accuracy (e.g., instructor load, term, course number, etc.).

V/T-1

VOCATIONAL - TECHNICAL COURSE DATA

1 DISTRICT	2 SCHOOL	3 INSTRUCTOR NUMBER	4 INSTRUCTOR NAME LAST FIRST INITIAL	5 COURSE TITLE	6 COURSE NUMBER	7 BUILDING NUMBER

8 SCH/WK	9 COURSE WEEKS	10 INSTRUCTOR LOAD	11 TERM	12 YEAR	13 PART	PROJECT	14-20

21 STUDENT NAME LAST FIRST INITIAL	22 SEX	23 RACE	24 AGE	25 GRADE	26 DISA/ HDCP	27 COMP	28 OCC/ PROG	29 STU HOURS	30 STUDENT ADDRESS STREET CITY	ZIP

Instructions For Completing V/T-1

For situations where more than one instructor taught the class during the time period shown in item #9, the top portion of the form must be completed for each instructor. The purpose of this supplementary information is to properly determine the instructor contact hours when situations such as team teaching and/or instructor terminations occur during the instructional period.

Some data items may not be available to the instructor although the detailed instructions below assist in some areas. Those data items which are questionable should be verified with the appropriate vocational supervisor. For example, if the instructor is unsure about the O.E. course number or the instructor load allocated to this course, then the supervisor can be of assistance.

Detailed Instructions For Completing V/T-1

Item Number	Item Name	Description
01	District	Enter the assigned four-digit number for the school district/postsecondary institution.
02	School/ Department	Enter the assigned three-digit number for the school/department through which the class is being taught. The numbers must agree with state and local designators.
03	Instructor Number	Enter the instructor's employee number used by the state and local educational agency for payroll purposes. If social security number is used, include dashes (e.g., 000-00-0000).
04	Instructor Name	Enter the instructor's last name, first name, and middle initial. Designations such as Jr., III, etc., are to be entered following the last name. If the class is taught by more than one instructor, then see the above instructions.
05	Course Title	Enter the designated O.E. course title for this class.

Item Number	Item Name	Description
06	Course Number	Enter the designated O.E. eight-digit course number for this class beginning with the program area and annexing zeros where appropriate (e.g., 14.111000).
07	Building Number	Enter the three-digit building number assigned for the building in which this course is taught.
08	Student Contact Hours/ Week	Enter the two-digit number of scheduled student contact hours per week designated for this course. For class periods of 50 to 60 minutes use 1.0 hours; for 40 to 49 minutes use 0.75 hours; for 31 to 39 minutes use 0.67 hours; for 25 to 30 minutes use 0.50 hours; for 15 to 24 minutes use 0.33 hours. Add the number of class hours the course meets each day to obtain weekly total.
09	Course	Enter the scheduled number of weeks (two-digits) the course is in session. If the course extends beyond the fiscal year enter only the weeks included in the fiscal year in which the course began. If the course extends beyond the fiscal year in which it began, another course form will be completed for that portion of the course to be charged to the subsequent fiscal year.
10	Instructor	Enter the assigned annual duty load given the instructor for this course. The full-time equivalent annual load must be used to compute the duty load assigned for this course. Example 1: A full-time equivalent instructor teaches 5 hours per day for 180 days. This course meets 1.0 hours per day for 180 days. The instructor load for this course would be 0.20, $\left(\frac{1.0 \times 180}{5 \times 180} = 0.20\right)$. Example 2: A full-time equivalent instructor teaches 15 hours per week for the annual term of 36 weeks. This course meets 3 hours per week for 18 weeks. The instructor load for this course would be 0.10, $\left(\frac{3 \times 18}{15 \times 36} = 0.10\right)$. Example 3: A part-time teacher is assigned this course or a regular teacher is paid an overload supplement for this course. If it is the only assignment of the part-time teacher then the instructor load is that ratio of the amount paid for this course to the average salary of teachers in the instructional area $\left(\frac{\text{\$1,000 paid for course}}{\text{\$10,000 av. voc. teacher's salary}} = 0.10 \text{ load}\right)$.

Item Number	Item Name	Description
		or $\left(\frac{\$1{,}000 \text{ overload supplement}}{\$10{,}000 \text{ av. voc. teacher's salary}} = 0.10 \text{ load}\right)$.
11	Term	Enter the designated one-digit number for the school term assigned by the state or local educational agency (e.g., 1-first semester, 2-second semester, 3-summer session, etc., 9-special term).
12	Year	Enter the two-digit number of the fiscal year in which the course is being taught. If the course extends beyond the fiscal year in which it began, another course data form will be completed for that fiscal year.
13	Part/ Project	This item shall be completed when state vocational project funds are used for offering this class. Check with your supervisor if you are in doubt. Two six-digit fields have been established for this item, 6 digits for PART and 6 digits for PROJECT numbers.
14-20	- - - - -	These items are open for adaptation based on local needs.
21	Student Name	The student names entered here should be the same as that reported in other vocational classes. The student name recorded on the official record of the school should be used. Assign "N" is no middle initial is given for a student. (It is suggested that the full last name, full first name and middle initial be used since double accounting occurs when both William and Bill are used in separate classes or when no middle initial is used.)
22	Sex	Enter the appropriate code representing the sex of the student, M for male or F for female.
23	Race	Enter the appropriate one-digit code representing the race/ethnic category to which the student appears to belong or identifies with. The categories are consistent with U.S.O.E. Handbook V (Revised) and do not necessarily represent scientific definitions of anthropological origins.

Code	Category
1:	American Indian or Alaskan Native
2:	Asian or Pacific Islander
3:	Black, non-Hispanic
4:	White, non-Hispanic
5:	Hispanic

Item Number	Item Name	Description
24	Age	Enter the age of the student.
25	Grade	Enter the appropriate two-digit grade or reporting level of the student (07 thru 16). In the case of an ungraded course offering, use code 98.
26	Disadvantaged/Handicapped	The two-digit code for disadvantaged/handicapped students shall be in accordance with the structure established for the state plan. Instructors should obtain category codes from their supervisor.
27	Completion	Enter the appropriate completion code to indicate the status of the student at the end of the course or at termination if prior to the scheduled end of the course. The instructor should obtain a list of codes consistent with the state's planned follow-up survey.
28	Occupational/Program	Enter the four-digit occupational/program code contained in the Department of Labor *Dictionary of Occupational Titles* (e.g., 404.8).
29	Student Hours	Enter the total student membership hours, rounded to the nearest hour, for each student. Determine the membership hours by multiplying the number of student contact hours per day (week) times the number of days (weeks) the student was a member of the class. Example 1: If the number of student contact hours per week for this course (item #8) is 5.0 and the student is a member of the class for the full year, 36 weeks, then the number of student contact hours is determined: 5.0 x 36 = 180 contact hours. Example 2: If the number of student contact hours for this course (item #8) is 3.0 and the student is a member of the class for the full semester, 18 weeks, then the number of student contact hours is determined: 3.0 x 18 = 54 contact hours. Example 3: If a student in example #1 entered class 10 days after the class started, therefore being a member for only 34 weeks, then that member's contact hours would be: 5.0 x 34 = 170 contact hours.
30	Student Address	Enter the student's mailing address (street, city, and zip code).
XX		(56 spaces remain for additional state/local information.)

Step 3 - Identify from existing central administration records data items 6-11 or gain such information directly from the instructor or their immediate supervisor. See general instructions for preparing cost data.

V/T-2 VOCATIONAL-TECHNICAL DIRECT COURSE COSTS

Introduction

The purpose of V/T-2 is to capture the known direct costs for each vocational course in each program area. Depending upon the existing accounting and data processing structure of the agency, several of the data elements required for this analysis may be input from the existing accounting system. For example, instructor salary may be input from the payroll distribution record. Also, items 1, 2, 3, 4, and 5 may be preprinted on the V/T-2 through a subroutine utilizing data generated by V/T-1. Since the assumption was made that the added-cost model should supplement, where possible, existing data processing routines and since student accounting records are more common than program/course accounting practices, the V/T-2 is designed to be independent. Therefore, the instructions that follow assume original data input.

Direct cost categories are those establish in U.S.O.E. Handbook II Revised. Local district and/or state accounting systems may be adapted for purposes of distributing expenditure objects, as may be postsecondary institutions accounting structures. All expenditure balances not known to be directly related to specific course offerings will be captured on V/T-4 and then prorated to courses on an FTE basis.

Recommended Procedures

Step 1 - The program area coordinator or other supervisor should prepare a V/T-2 for each program area. Enter the program area code and title (e.g., 01 Agriculture).

Step 2 - Identify from existing central administration records data items 1-5 or gain such information directly from the instructors or their immediate supervisor.

VOCATIONAL-TECHNICAL DIRECT COURSE COSTS

PROGRAM AREA 12 ______________________

1 COURSE NUMBER	2 INSTR NUMBER	3 INSTRUCTOR NAME LAST FI MI	4 INSTR LOAD	5 FTE STUDENTS	6 SALARY	7 BENEFITS	8 PURCHASED SERVICES	9 MATERIALS & SUPPLIES	10 OTHER	11 CAPITAL OUTLAY	13 PART/PROJECT
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Instructions For Completing V/T-2

The amounts entered as expenditures by object for all courses, the other personnel program costs (V/T-3), and the unassigned program costs (V/T-4) sum to equal the total expenditures for vocational-technical education. It is important to associate as much of the direct course cost as possible to the appropriate instructional offering since prorating of the residual costs identified on V/T-4 tends to "average" costs; perhaps inappropriately. For example, welding rods often amount to a large expenditure and should be attributed directly to the course rather than averaged over all courses in the program area.

Detailed Instructions For Completing V/T-2

Item Number	Item Name	Description
01	Course Number	Enter the designated O.E. eight-digit course number for the class beginning with the program area and annexing zeros where appropriate (e.g., 04.011000).
02	Instructor Number	Enter the instructor's employee number used by the state and/or local educational agency for payroll purposes. If the social security number is used, include dashes (e.g., 000-00-0000).
03	Instructor Name	Enter the instructor's last name, first name, and middle initial. Designations such as Jr., III, etc., are to be entered following the last name. If the class is taught by more than one instructor, enter necessary data for each; see instructions for V/T-1.
04	Instructor Load	Enter the assigned annual duty load given the instructor for each course. The full-time equivalent annual load must be used to compute the duty load assigned.
		Example 1: A full-time equivalent instructor teaches 5 hours per day for 180 days. The course under consideration meets 1.0 hours per day for 180 days. the instructor load for that course would be determined as follows: $\left(\frac{1.0 \times 180}{5 \times 180} = 0.20\right)$.

Item Number	Item Name	Description
		Example 2: A full-time equivalent instructor teaches 15 hours per week for the annual term of 36 weeks. The course meets 3 hours per week for 18 weeks. The instructor load for that course would be determined as follows: $\left(\frac{3 \times 18}{15 \times 36} = 0.10\right)$. Example 3: A part-time teacher is assigned a course or a regular teacher is paid an overload supplement for the course. If it is the only assignment, use the ratio of the amount paid for the course being considered to the average salary of teachers in the instructional area $\left(\frac{\$1{,}000 \text{ paid for course}}{\$10{,}000 \text{ av. voc. teacher's salary}} = 0.10\right)$, or $\left(\frac{\$1{,}000 \text{ paid for overload supplement}}{\$10{,}000 \text{ av. voc. teacher's salary}} = 0.10\right)$.
05	FTE Students	Enter the full-time equivalent students enrolled in each course. If V/T-1 or similar student contact hours (SCH) data are available, then the FTE students for the course is determined by $\left(\frac{\text{Sum of SCH}}{900}\right)$. If an enrollment survey is made at a particular time during the course, then the FTE students is determined by: $\left(\frac{\text{Enrollment} \times \text{hours/week} \times \text{\# weeks}}{36 \text{ weeks}}\right)$; use the same computation if average daily membership (ADM) is computed instead of enrollment. If average daily attendance is used for pupil accounting, convert to ADM and use the above method to obtain FTE.
06	Salary	Enter the portion of the salary of the instructor associated with each course. For example, if the annual contract salary is \$10,000 and the instructor load for the course is 0.20, then determine the amount as follows: (.20 x \$10,000 = \$2,000). Be sure that all of a part-time instructor's payment is included; or, the overload supplement of a regular teacher. It is recommended that full-time and part-time teachers be placed on separate forms and thereby facilitate the computations.
07	Benefits	Employee benefits for direct salaries are calculated based on either an average of benefits paid all agency personnel or through direct input. Method 1 $\left(\frac{\text{Total agency employee benefits}}{\text{Total agency salaries}}\right) \times$ (instructor's salary). Where data exist, it is preferable to use the ratio

Item Number	Item Name	Description
		of total benefits paid for instructional personnel to total salaries paid for instructional personnel. Method 2 Multiply social security rate (state retirement rate) plus other standard rates (e.g., workman's compensation) times the portion of salary that applies and add dollar value of hospitalization insurance and other benefit costs.
08	Purchased Services	Enter the dollar value of purchased services associated with each course. The instructor is the is the best resource person for these data if the accounting system in use does not associate purchases with courses.
09	Materials and Supplies	Enter the dollar-value of materials and supplies associated with each course. The instructor is the best resource person for these data if the accounting system in use does not associate purchases with courses.
10	Other	Enter the dollar-value of other expenditures (e.g., dues and fees) associated with each course.
11	Capital Outlay	Enter the dollar-value of capital outlay items (replacement and/or new equipment) purchased during the current year that are associated with each course.
12	Program Area	Enter the program area code and title (e.g., 01 agriculture).
13	Part/ Project	Enter the PART and/or PROJECT numbers associated with each course that is supported by special state/federal funds. Two six-digit fields have been established for this purpose.
XX		(54 spaces remain for additional state/local information.)

V/T-3 VOCATIONAL-TECHNICAL OTHER PERSONNEL PROGRAM COSTS

Introduction

The general purpose of Form V/T-3 is to assign costs of "other" personnel associated with particular program areas. For example, supervisors and clerical personnel associated with a particular program should have their salaries and benefits assigned to the respective program areas. Administrators and clerical personnel, and guidance personnel costs should be assigned to all programs. Provision is made to distribute these costs to three program areas if necessary.

Recommended Procedures

Step 1 - The Director of Vocational Education should be responsible for distribution of "other" personnel costs to the appropriate program areas.

VOCATIONAL-TECHNICAL OTHER PERSONNEL PROGRAM COSTS

1 EMPLOYEE NUMBER	2 EMPLOYEE NAME LAST FIRST MI	3 POSITION CODE	4 SALARY	5 BENEFITS	VOCATIONAL AREA NONTEACHING ASSIGNMENT					
					6 V/T AREA	7 %	8 AREA	9 %	10 AREA	11 %

Detailed Instructions For Completing V/T-3

Item Number	Item Name	Description
01	Employee Number	Enter the employment number used by the state and/or local educational agency for payroll purposes. If the social security number is used, include dashes (e.g., 000-00-0000).
02	Employee Name	Enter the employee's last name, first name, and middle initial. Designations such as Jr., III, etc., are to be entered following the last name.
03	Position Code	Enter position code if included in the personnel record system of the agency..
04	Salary	Enter the annual salary of each employee.
05	Benefits	Employee benefits are calculated either on an average of benefits paid all agency personnel or through direct input. Method 1 $\left(\frac{\text{Total agency employee benefits}}{\text{Total agency salaries}}\right)$ X (employee's salary). Method 2 Multiply social security (state/local retirement) plus other standard rates (e.g., workman's compensation) times the employee's salary subject to those rates and add dollar values for hospitalization and other benefit costs.
06,08, 10	V/T Area	Enter the vocational areas to which costs are to be assigned (e.g., 04, 14).
07,09, 11	Percent	Enter the percent of costs to be assigned to each area.

Examples:

		Area	%	Area	%
#1	Director	99	100		
#2	Supervisor	16	50	17	50
#3	Coordinator (part-time)	09	50		

Item Number	Item Name	Description
		In example #1, the director's salary and benefits are to be prorated to all programs. In example #3, the coordinator's salary and benefits amount to only 50 percent assignment at the program level, the other 50 percent was perhaps distributed through courses taught by that individual.
XX		(18 spaces remain for state/local adaptation.)

V/T-4 VOCATIONAL-TECHNICAL UNASSIGNED PROGRAM COSTS

Introduction

The purpose of Form V/T-4 is to distribute, where possible, all remaining vocational education costs to programs. The designations of "Instructional" and "Administrative and Other Support" are made for purposes of proration. Unassigned instructional expenditures will be prorated to programs and then courses on an FTE student basis while Administrative and Other Support expenditures will be prorated to programs and then to courses on an FTE instructor basis. Those expenditures which cannot be identified with any program area should be classified as "unknown".

Recommended Procedures

Step 1 - Assign to program areas those expenditures which are known to be directly related to the program area but for which it is unknown which course(s) experienced the expenditure (or when it would be inappropriate to do so).

Step 2 - Assign "unknown" expenditures to all V/T programs (category 99).

Step 3 - Sum all assigned and unassigned program costs (V/T-2, V/T-3, and V/T-4). If the total vocational education expenditure is known, compare the sum with the known amount. Any residual should be assigned to all V/T programs (category 99).

VOCATIONAL-TECHNICAL UNASSIGNED PROGRAM COSTS

PROGRAM AREA	INSTRUCTIONAL			ADMINISTRATIVE & OTHER SUPPORT			7 CAPITAL OUTLAY
	1 PURCHASED SERVICES	2 MATERIALS & SUPPLIES	3 Other & 99	4 PURCHASED SERVICES	5 MATERIALS & SUPPLIES	6 Other & 99	
01 Agriculture							
04 Distributive							
07 Health							
09 Home Economics							
14 Office Occupations							
16 Technical							
17 Trade and Industrial							
Totals							

Detailed Instructions For Completing V/T-4

Item Number	Item Name	Description
01	Purchased Services	Enter the dollar value of instructional related purchase services known to be associated with each program area. Enter the known balance, after distribution, as "99 All V/T Programs".
02	Materials and Supplies	Enter the dollar value of instructional related materials and supplies known to be associated with each program area. Enter the known balance, after distribution, as "99 All V/T Programs".
03	Other	Enter the dollar value of instructional related unclassified or other expenditures (e.g., dues and fees) known to be associated with each program area. Enter the known balance and distribution of "99 All V/T Programs" if instructional related.
04	Purchased Services	Enter the dollar value of administrative and other support purchased services known to be associated with each program area. Enter the known balance, after distribution, as "99 All V/T Programs".
05	Materials and Supplies	Enter the dollar value of administrative and other support materials and supplies known to be associated with each program area. Enter the known balance, after distribution, as "99 All V/T Programs".
06	Other	Enter the dollar value of administrative and other support "other" (e.g., dues and fees) expenditures known to be associated with each program area. Enter the known balance and distribution of "99 All V/T Programs" if administrative related.
07	Capital Outlay	Enter the dollar value of capital outlay items (equipment, etc.) purchased during the current year that are associated with each program area. Enter the known balance, after distribution, as "99 All V/T Programs".
08		(26 spaces remain for state/local adaptation.)

V/T-5 VOCATIONAL-TECHNICAL PROGRAM AREA COSTS

Summary Data Worksheet

Introduction

The major purposes of V/T-5 are two-fold, first to establish the total vocational program expenditures and thereby facilitate the determination of the "basic" program expenditures (B-1) and second, to establish the cost indicies for the seven program areas and for the total vocational program.

Completion of the lower half of V/T-5, Program Area Costs, Student, is contingent upon completion of the upper half of that form and the completion of form B-1. Also, form B-1 requires data from the upper half of V/T-5.

Recommended Procedures

Step 1 - Complete the upper half of V/T-5 utilizing data from V/T-2, V/T-3, and V/T-4.

Step 2 - Enter the sum of item #15, total costs, as item #8 on form B-1.

Step 3 - Complete the lower half of V/T-5.

VOCATIONAL-TECHNICAL PROGRAM AREA COSTS

SUMMARY DATA WORKSHEET

1 PROGRAM AREA	DIRECT COSTS V/T-2					OTHER V/T-3		UNCLASSIFIED PROGRAM COSTS V/T-4							
								INSTRUCTIONAL			ADMINISTRATIVE/OTHER				
	2 SALARIES	3 BENEFITS	4 PURCHASED SERVICES	5 MATERIALS & SUPPLIES	6 OTHER	7 SALARIES	8 BENEFITS	9 PURCHASED SERVICES	10 MATERIALS & SUPPLIES	11 OTHER	12 PURCHASED SERVICES	13 MATERIALS & SUPPLIES	14 OTHER	15 TOTALS	16 CAPITAL OUTLAY (V/T-4)
01 Agriculture															
04 Distributive															
07 Health															
09 Home Ec.															
14 Office Occup.															
16 Technical															
17 Trade & Ind.															
TOTALS															

PROGRAM AREA COSTS/STUDENT

SUMMARY DATA WORKSHEET

20 PROGRAM AREA	21 FTE TEACHERS (V/T-2)	22 FTE STUDENTS (V/T-2)	23 TOTAL DIRECT COSTS (item #15 above)	24 TOTAL INDIRECT COSTS/STUDENT	25 TOTAL INDIRECT COSTS/TEACHER	26 TOTAL COSTS	27 COSTS/FTE	28 COST INDEX	29 CAPITAL COSTS PER STUDENT
01 Agriculture									
04 Distributive									
07 Health									
09 Home Ec.									
14 Office Occup.									
16 Technical									
17 Trade & Ind.									
TOTALS									

Detailed Instructions For Completing V/T-5

Item Number	Item Name	Description
01	Program Area	Names and codes of program areas.
02-14		These data elements are similarly named on forms V/T-2, V/T-3, and V/T-4. Transfer the values to the appropriate column.
15	Totals	Enter sums of items 02-14 for each program area. Sum all columns. Transfer audited sum of item #15 to item #8, form B-1.
16	Capital Outlay	Transfer values from item #7, V/T-4.
20	Program Area	Names and codes of program areas.
21	FTE Teachers	Enter sum of item #5, instructor load, form V/T-2.
22	FTE Students	Enter sum of item #6, V/T-2.
23	Total Direct Costs	Enter item #15, above, for each program area.
24	Total Indirect Costs/ Student	Enter the product of item #22 (V/T-5) and item #32 (B-1).
25	Total Indirect Costs/ Teacher	Enter the product of item #21 (V/T-5) and item #33 (B-1).
26	Total Costs	Enter sums of items #23, #24, and #25 for each program area. Sum columns #21-#26.
27	Costs/FTE	Enter the quotient of item #25 and item #22 for each program area. Also divide the sum of item #25 by the sum of item #22.

Item Number	Item Name	Description
28	Cost Index	Enter the quotient of item #27 (V/T-5) and item #13 (B-1) for each program area. In the totals space, enter the quotient of the amount in item #27 and item #10 (B-1).
29	Capital Costs/ Student	Enter the quotient of item #16 and item #22 for each program area. In the totals space, enter the quotient of the sum of item #16 and the sum of item #22.

COURSE COST ALGORITHM

The cost of any vocational course listed on V/T-2 may be determined by adding to those direct expenditures other expenditures for indirect costs--both vocational and agency-wide. The following algorithm expresses the procedure:

A. Sum for the target course items #6, 7, 8, 9, & 10 (V/T-2) ______

B. Sum the sums of items #4 & 5 (V/T-3) ______

C. Sum the sums of items #1, 2, & 3 (V/T-4) ______

D. Sum the sums of items #4, 5, & 6 (V/T-4) ______

E. Sum item #4 (V/T-2) ______

F. Sum item #5 (V/T-2) ______

G. Record item #32 (B-1) times students, target course ______

H. Record FTE students for target course (item #5, V/T-2) ______

I. Record Sum of Instructor Loads for target course (item #4, V/T-2) ______

J. Multiply item #33 (B-1) times instructor load for this course (item #4, V/T-2) ______

$$\text{Course Cost} = \frac{\text{direct}}{A} + \frac{\text{V/T-indirect}}{\left(I \times \frac{B+D}{E}\right) + \left(\frac{C}{F} \times H\right)} + \frac{\text{agency-indirect}}{G + J}$$

APPENDICES

SAMPLE DATA CLASSIFICATION
FOR
SCHOOL DISTRICT DATA

[Yearend Report]

Enrollment and Teacher Data

School/Program	Enrollment	FTE Teachers
Elementary	________	________
Middle	________	________
Secondary	________	________
Other Regular	________	________
Special Education/Handicapped	________	________
Adult/Continuing Education	________	________

Local definition of enrollment ________________________________

Local definition of FTE Teacher ________________________________

Expenditure Data (less capital outlay)

1000 INSTRUCTION

1100 REGULAR EDUCATION PROGRAMS

1110 ELEMENTARY SCHOOLS ________

1120 MIDDLE SCHOOLS ________

1130 SECONDARY SCHOOLS ________

1132 VOCATIONAL ________

1190 OTHER REGULAR ________

1200 SPECIAL EDUCATION/HANDICAPPED ________

1300 ADULT/CONTINUING EDUCATION ________ ________

2000 SUPPORT SERVICES

2100 PUPIL SUPPORT SERVICES ________

2200 INSTRUCTIONAL SUPPORT SERVICES ________

2300 GENERAL ADMINISTRATION ________

2400 SCHOOL ADMINISTRATION ________

2500 BUSINESS SERVICES ________

2550 TRANSPORTATION ________

2560 FOOD SERVICES ________

2600 CENTRAL SERVICES ________

2900 OTHER REGULAR ________ ________

3000 COMMUNITY SERVICES ________

4000 NONPROGRAMMED CHARGES ________

TOTAL (less D/S & C/O) ________

- -

5000 DEBT SERVICES (Total) ________

SAMPLE DATA CLASSIFICATION
FOR
POSTSECONDARY DATA

[Yearend Report]

Enrollment and Teacher Data

Division/Program	Credit Hours	Contact Hours	FTE Faculty
Graduate	________	________	________
Undergraduate (Years 3 & 4)	________	________	________
Undergraduate (Years 1 & 2)	________	________	________
Occupational Program	________	________	________
Adult/Continuing Education	________	________	________
Other (Specify)	________	________	________
TOTAL	________	________	________

Expenditure Data (less capital outlay)

1.000	Instruction			
	1.100	General Academic Instruction	$________	
	1.200	Occupational & Vocational Instruction	________	
	1.300	Community Education	________	
	1.400	Preparatory & Adult Basic Education	________	$________
2.000	Research			
	2.100	Institutes & Research Centers	$________	
	2.200	Individual or Project Research	________	________
3.000	Public Service			
	3.100	Hospital Operation (noninstructional activities)	$________	
	3.200	Community Services	________	
	3.300	Cooperative Extension Services	________	
	3.400	Radio & Television	________	________
4.000	Academic Support			
	4.100	Libraries	$________	
	4.200	Museums & Galleries	________	
	4.300	Audio/Visual Services	________	
	4.400	Computing Support	________	
	4.500	Ancillary Support	________	
	4.600	Academic Administration	________	
	4.700	Course & Curriculum Development	________	
	4.800	Academic Personnel Development	________	________

5.000	Student Services			
	5.100	Student Services Administration	$	
	5.200	Social & Cultural Development		
	5.300	Counseling & Career Guidance		
	5.400	Financial Aid Administration		
	5.500	Student Enterprises (see Auxiliary Enterprise 7.550)		
	5.600	Collegiate Athletics (see Auxiliary Enterprise 7.560)		
	5.700	Student Health Services		
	5.800	Student Admission & Records		$
6.000	Institutional Support			
	6.100	Executive Management	$	
	6.200	Fiscal Operations		
	6.300	General Administrative Services		
	6.400	Logistical Services		
	6.500	Operation & Maintenance of Plant		
	6.600	Faculty/Staff Services (see Auxiliary Enterprise 7.660)		
	6.700	Community Relations		
7.000	Auxiliary Enterprises			
	7.550	Auxiliary Enterprises -- Student	$ *	
	7.560	Auxiliary Enterprises -- Collegiate Athletics	*	
	7.660	Auxiliary Enterprises -- Faculty/Staff	*	*
	*(Do not double-count with Student Services or Institutional Support.)			
8.000	Scholarships and Fellowships			
	8.100	Scholarships	$	
	8.200	Fellowships		
9.000	Debt Service & Grant Matching (Mandatory Transfers)			
	9.100	Debt Service on Educational Plant	$	
	9.200	Debt Service on Auxiliary Enterprises		
	9.300	Debt Service on Hospitals		
	9.400	Loan Fund Matching Grants		
	9.500	Other Mandatory Transfers		
XXXXX	TOTAL EXPENDITURES (less capital outlay)			$
	Total Capital Outlay Expenditures			$

Definition Sources for the Added Cost of Vocational Education Model

I. Current Operating Expenditures Elements

  A. Option "A"

    1. Expenditures by function - Financial Accounting - Handbook II, Revised, pp. 24-27 (OE-73-11800)

  B. Option "B"

    1. Expenditures by function - Higher Education Finance Manual, pp. 41-46 (NCES-75-118)

  C. Option "C"

    1. Expenditures by objects - Financial Accounting - Handbook II, Revised, pp. 23-34 (OE-73-11800)

  D. Option "D"

    1. Expenditures by objects - Information Exchange Procedures -- Cost Study Procedures, pp. 91-93 (NCHEMS at WICHE, Boulder, CO.: 1975, Technical Report 65)

    2. The recommended objects are:

      a. Instruction and Research: Professional Personnel Compensation
      b. Administrative and Support: Professional Personnel Compensation
      c. Nonexempt Staff Compensation
      d. Supplies and Services (including travel, communications, etc.)
      e. Rental Expenditures - Buildings and Land Improvements
      f. Rental Expenditures - Equipment
      g. Capital Expenditures - Equipment
      h. Capital Expenditures - Building and Land Improvements
      i. Expenditures for Items Purchased for Resale

II. Student Enrollment and Teacher Assignment

  A. Secondary Schools and Postsecondary Schools

    1. Student/Pupil Accounting - Handbook V, Revised, (OE-75-315)

III. Course Definitions

  A. Secondary Schools and Postsecondary Schools

    1. Standard Terminology for Curriculum and Instruction in Local and State School Systems - Handbook VI, 1970 (OE-23052)

Pupil Accounting and Cost Accounting

Selected Definitions

The pupil accounting and cost accounting operational definitions that follow relate to data forms provided to determine added-costs of vocational education. The pupil accounting elements are designed to determine full-time-equivalent (FTE) membership for each vocational education course (V/T-2) and to report total enrollments of postsecondary institutions and school districts (B-1). Those data contribute to determining vocational course/program added-cost per FTE and provide a basis for prorating appropriate indirect charges. Other associated data elements necessary for these purposes include indentification of the term(s) each course operates so that course/program costs may be annualized and identification of vocational education teacher assignments for direct cost purposes and total staff assignments for indirect cost proration purposes. Administrative, supervisory and support staff assignments are also determined.

The cost accounting elements are designed to capture course costs of each vocational program. Expenditures are classified by function (B-1) for purposes of targeting dollars expended by general program categories and for other support services. The structure also allows for identifying those expenditure amounts not to be included in the computations of added-cost (e.g., capital outlay and debt service) and those general expenditures to be prorated to all programs. Course cost data elements (V/T-2, 3, and 4) are designed to capture expenditures directly associated with vocational education instructional activities.

The pupil accounting definitions are as follows:

Regular Academic Year

That school term which begins usually in the late summer or fall and ends in the spring. Excludes summer and extra terms.

Semester

A subdivision of the regular academic year approximately equal to 1/2 of the regular academic year. Usually 18 weeks in duration in secondary schools, 16 weeks in postsecondary.

Trimester

A subdivision of the calendar year approximately equal to 1/3 of the year. Usually about 15 weeks in duration. The fall and winter trimesters usually constitute the regular academic year.

Quarter

A subdivision of the calendar year approximately equal to 1/4 of the year Usually about 10 to 12 weeks in duration. The fall, winter, and spring quarters usually constitute the regular academic year.

Quinmester

A subdivision of the calendar year approximately equal to 1/5 of the year. Usually about 9 weeks in duration. Beginning in the fall, the first 4 quinmesters usually constitute the regular academic year.

Other Terms

Any term which falls outside of the calendar of the regular academic year and/or which runs in addition to the regular term structure (mini-term, workshop, short course, etc.).

ADA

Average daily attendance - the aggregate attendance in a given course, program, or school during a given reporting period divided by the number of days school is in session during this period.

ADM

Average daily membership - the sum of the days enrollment (present and absent) of all students in a course, program, or school when school is in session during a given reporting period, divided by the number of days school is in session during this period.

FTE Student (secondary)

A combination of full-time or part-time enrollments in any one of the programs which is the equivalent of one full-time student based on a fraction of a full-time equivalent membership in each program equal to the number of net hours per week for which he is a member, divided by twenty-five.

FTE Students (postsecondary credit program)

The equivalent number of full-time students in a college at an established census date, determined by dividing the assumed normal individual student load of credit hours into the total student credit hours as of that date.

FTE Teacher

A combination of full-time or part-time teachers, whose total assigned instructional work load equals a normal daily, weekly, or credit-hour teacher work load, as locally defined.

The expenditures by function definitions are as follows:

OPTION A: Secondary Schools

1000 INSTRUCTION

Activities dealing directly with the teaching of pupils, or the interaction between teacher and pupils. Teaching may be provided for pupils in a school classroom, in another location such as a home or hospital, and in other learning situations such as those involving cocurricular activities. It may also be provided through some other approved medium such as television, radio, telephone, and correspondence. Included here are the activities of aides or assistants of any type (clerk. graders, teaching machines, etc.) which assist in the instructional process.

1100 Regular Programs

Instructional activities designed primarily to prepare pupils for activities as citizens, family members, and workers, as contrasted with programs designed to improve or overcome physical, mental, social and/or emotional handicaps. Regular Programs include Elementary; Middle/Junior High; and High School. High School is broken into two types of programs -- Preparatory, Postsecondary Education Program and Preparatory, Postsecondary Employment Program.

1110 Elementary Programs - Learning experiences concerned with knowledge, skills, appreciations, attitudes, and behavioral characteristics considered to be needed by all pupils in terms of their awareness of life within our culture and the world of work and which normally may be achieved during the elementary school years.

1120 Middle/Junior High Programs - Learning experiences concerned with knowledge, skills, appreciations, attitudes, and behavioral characteristics considered to be needed by all pupils in terms of understanding themselves and their relationships with society and various career clusters, and which normally may be achieved during the middle and/or junior high school years. These are defined by applicable State laws and regulations.

1130 High School Programs - Learning experiences concerned with knowledge, skills, attitudes, and behavioral characteristics considered to be needed by all pupils in terms of understanding themselves and their relationships with society and the various occupations and/or professions which normally may be achieved in the high school years.

1132 Preparatory, Postsecondary Employment Programs - Learning experiences concerned with knowledge, skills, appreciations, attitudes, and behavioral characteristics considered to be needed by those pupils desiring immediate postsecondary employment which normally may be achieved during the secondary school years.

1190 Other High School Programs - Any High School Program other than those above.

1200 Special Programs

Instructional activities designed primarily to deal with pupil having special needs. The Special Program Service Area includes Preprimary, Elementary, and Secondary services for the (1) Gifted and Talented; (2) Mentally Retarded; (3) Physically Handicapped; (4) Emotionally Disturbed; (5) Culturally Different; (6) Pupils with Learning Disabilities; and (7) Special Programs for other types of pupils.

1300 Adult/Continuing Education Programs

Learning experiences designed to develop knowledge and skills to meet immediate and long range educational objectives of adults who, having completed or interrupted formal schooling, have accepted adult roles and responsibilities. Programs include activities to foster the development of fundamental tools of learning; prepare students for a postsecondary career; prepare students for postsecondary education programs; upgrade occupational competence; prepare students for a new or different career; develop skills and appreciations for special interests; or to enrich the aesthetic qualities of life.

2000 SUPPORTING SERVICES

Supporting services are those services which provide administrative, technical, personal (such as guidance and health), and logistical support to facilitate and enhance Instruction and, to a lesser degree, Community Services, Supporting Services exist to sustain and enhance Instruction, rather than as entities within themselves.

2100 Support Services--Pupils

Those activities which are designed to assess and improve the well-being of pupils and to supplement the teaching process.

2200 Support Services--Instructional Staff

Activities associated with assisting the instructional staff with the content and process of providing learning experiences for pupils.

2300 Support Services--General Administration

Activities concerned with establishing and administering policy in connection with operating the LEA (Local Educational Agency).

2400 Support Services--School Administration

Activities concerned with overall administrative responsibility for a single school or a group of schools.

2500 Support Services--Business

Activities concerned with purchasing, paying, transporting, exchanging, and maintaining goods and services for the LEA. Included are the fiscal, acquisition of facilities, operation and maintenance, and internal services for operating all schools.

2550 Pupil Transportation Services - Activities concerned with the conveyance of pupils to and from school, as provided by State law. Included are trips between home and school and trips to school activities. (To separate trips for school activities, a cost per mile could be charged in memorandum accounting.)

2600 Support Services--Central

Activities, other than general administration, which support each of the other instructional and supporting services programs. These activities include planning, research, development, evaluation, information, staff, statistical, and data processing services.

2900 Other Supporting Services

Activities of any supporting service or classification of services, general in nature, which cannot be classified in the preceding service areas or Areas of Responsibility

3000 COMMUNITY SERVICES

Activities which are not directly related to the provision of education for pupils in a LEA. These include services such as community recreation programs, civic activities, public libraries, programs of custody and care of children, and community welfare activities provided by the LEA for the community as a whole or some segment of the community.

4000 NONPROGRAMED CHARGES

Conduit-type (outgoing transfers) payments to other LEAs or administrative units in the State or in another State, and transfers from one fund to another fund in the LEA.

5000 DEBT SERVICES

The servicing of the debt of a LEA. Categories of debt services are listed under objects.

5132 Vocational Program Debt Services

The servicing of LEA debt directly related to vocational programs.

OPTION B: Colleges

1.000 INSTRUCTION - Expenditures for activities which are part of an institution's instructional program, both credit and noncredit, and dealing directly with the teaching of students or interaction between teacher(s) and students. Remedial and tutorial activities are included in this category. Departmental research and public service activities which are not separately budgeted are included in this category. Those expenditures for academic administration at the level where primary responsibilities are in administration (such as academic dean) are excluded from this category, but expenditures for the teaching department chairman level of administration of instructional programs are included.

1.100 General Academic Instruction - Expenditures for instructional activities occurring during the academic year defined by the institution and classified according to the academic course categories 0100 through 4900 of the Higher Education General Information System (HEGIS). Credit, noncredit, "open university," home study, and short courses falling within the HEGIS categories 0100 through 4900 are included.

1.200 Occupational and Vocational Instruction - Expenditures for instructional activities occurring during the academic year defined by the institution and classified according to either the HEGIS course categories 5000 through 5500 or the U.S.O.E. Handbook VI course classifications for occupational instruction. Credit, noncredit, "open university," home study, and short courses are included.

1.300 Community Education - Expenditures for activities, both credit and noncredit, which provide instruction to individuals or groups external to the institution, but a part of the community at large. Community instructional activities administered by an extension division or other institutional unit are included.

1.400 Preparatory and Adult Basic Education - Expenditures for instructional activities giving students the basic skills and knowledge needed for admission to the formal academic courses leading to a postsecondary degree or certificate. Included are those activities designed to enable the student to achieve completion of high school and activities deemed supplemental to academic degree or certificate programs; i.e., remedial, developmental, and/or special instrucational services. Only the regular academic staff activities performed as a part of the normal workload are included here.

1.900 Special Session Instruction - Expenditures for instructional activities occurring in a summer or interim session, or occurring in some period not included within the institution's regular term. A special session is a unique session, not just a regular academic term held during summer months. Only experditures made solely as a result of conducting the special session are included. Expenditures for a special session which extends beyond a fiscal year end are included in the fiscal year where the major portion of the session occurs, provided that both the revenues and expenditures associated with the session are accounted for in the same year.

2.000 RESEARCH - Expenditures for activities intended expressly for the production of research results and either under contract with an external sponsoring agency, or sponsored by and budgeted via a separate unit of the institution. Both sponsored research and internally supported research programs are included, but all sponsored programs are not included. Expenditures for sponsored programs, such as training grant programs, are excluded. Only expenditures for actual research programs are included.

2.100 Institutes and Research Centers - Expenditures for activities related directly to research and which are conducted by an established organizational unit created to manage research activities.

2.200 Individual or Project Research - Expenditures for research that is managed by a regular academic department. Research initiated as a result of contracts, grants, or through allocations of institutional resources separately budgeted for research are included.

3.000 PUBLIC SERVICE - Expenditures resulting from budgeted activities designed to provide services to the general community. The services are noninstructional (in the traditional sense), but are beneficial to identified external groups in the institution's community. Seminars, workshops, or similar projects organized to provide services to specific community sub-groups are included here.

3.100 Hospital Operation--Patient Services (noninstructional activities) - Expenditures incurred in the operation of a hospital (excluding depreciation). Patient related services including nursing and other professional activities; administrative, fiscal and general support activities; and physical plant operation and maintenance for hospitals are included. (Debt retirement, other financing expenses, and renewals and/or replacements are reported elsewhere.)

3.200 Community Services - Expenditures for activities (other than instruction) intended to provide general services to the external community. This includes those activities which make the unique capabilities and resources existing within the institution available to the external community. Conferences, workshops, seminars, institutes, advisory services, speakers bureaus, reference bureaus, professional consulting, and similar activities are included.

3.300 Cooperative Extension Services - Expenditures for noninstructional activities resulting from cooperative efforts between the institution and one or more other governmental agencies. The extension activities exhibit the common characteristic of having program planning and fiscal control vested equally in the institution and the other governmental unit(s). Agricultural extension, home economics extension, and urban extension are examples.

3.400 Radio and Television - Expenditures for public broadcasting activities which are distinct from instructional activities in related curricula.

4.000 ACADEMIC SUPPORT - Expenditures for activities providing supporting services to the three major programs of institutions of higher education; i.e., instruction, research, and public service. The services are an integral part of the operations of these major programs. They include activities relating to the retention, preservation, and display of records and materials as well as the providing of services that assist directly in the functioning of the three academic programs. The media and technology used in the three major programs, including computing support, and the supporting administrative operations within the academic units of the institution are included.

4.100 Libraries - Expenditures for activities that are related to management and servicing of any catalogued or classified published materials collection.

4.200 Museums and Galleries - Expenditures for activities that are related to the management and servicing of collections of historical materials, art objects, scientific displays, and artifacts (libraries excluded). The collection, preservation, and exhibition of these materials are included.

4.300 Audio/Visual Services - Expenditures for activities related directly to providing media services support for the three major programs: instruction, research, and public service. This includes providing audio and/or visual materials as well as related services.

4.400 Computing Support - Expenditures for activities providing electronic data processing or computer services support for the three major programs: instruction, research, and public service. (General administrative data processing is excluded. See: 6.300 Institutional Support.).

4.500 Ancillary Support - Expenditures for activities not appropriately classified within 4.100 through 4.400, but supporting in a related manner the three major programs. A college of education's demonstration school operation is an example. (Hospitals are excluded. See: 3.100.)

4.600 Academic Administration - Expenditures for administrative support activities involved in the direction and management of the three major programs: instruction, research, and public service. Expenditures for upper-level, nonteaching management personnel, such as academic deans, associate deans, assistant deans, etc., are included. Department chairman level management is excluded. (See: 1.000.)

4.700 Course and Curriculum Development - Expenditures for activities occurring as a result of separately budgeted functions designed to yield various future instructional offerings of the institution. Expenditures for activities intended for the improvement of current course content and/or presentation are included.

4.800 Academic Personnel Development - Expenditures for activities relating to the improvement of faculty competencies in each faculty member's specialized discipline. Expenditures intended for the improvement of any faculty members overall professional development are included.

5.000 STUDENT SERVICES - Expenditures for activities relating to student admissions, the functions of the registrar's office, and other services provided for the purposes of contributing to the students' intellectual, cultural, and social development. Include here those extracurricular activities designed to improve the emotional and physical well-being of students outside the formal instructional program environment.

5.100 Student Services Administration - Expenditures for activities associated with the management of student services programs at the level of vice-president, dean, associate dean, or similar position having primary responsibilities for extracurricular, noninstructional services for students.

5.200 Social and Cultural Development - Expenditures for activities related directly to programs providing for the social and cultural development of students (degree curriculum activities excluded). Cultural events, student newspapers, intramural athletics, student clubs and government organizations, and similar activities are included. Intercollegiate athletics are excluded (see: Auxiliary Enterprises 7.560).

5.300 Counseling and Career Guidance - Expenditures for activities related to personal and career-choice counseling. Counseling centers, testing and guidance, and placement offices are included in this category. Informal academic counseling, by teaching faculty and with regard to academic course choices, is specifically excluded.

5.400 Financial Aid Administration - Expenditures for activities directly related to the organization and management of student financial aid services. Actual aid, grants and fellowships, are not included here.

5.500 Student Enterprises - (See: Auxiliary Enterprises 7.550.)

5.600 Collegiate Athletics - (See: Auxiliary Enterprises 7.560.)

5.700 Student Health Services - Expenditures for those activities directly related to providing a clinic or similar health service center operated as a service to the students and not intended to be a self-supporting auxiliary enterprise.

5.800 Student Admissions and Records - Expenditures for activities of the student admissions and registrar's offices.

6.000 INSTITUTIONAL SUPPORT - Expenditures for activities occurring within organizational units established for the primary purpose of providing operational support for the daily functioning of an institution, physical plant operations excluded.

6.100 Executive Management - Expenditures for activities occurring at the central, executive-management level of an institution. Long-range planning for the entire institution, governing board activities, institution-wide goal-setting and programming, and legal services are examples.

6.200 Fiscal Operations - Expenditures for activities related to fiscal control and the institution's investment of surplus funds. The accounting, auditing, and funds disbursement functions are included here.

6.300 General Administrative Services - Expenditures for activities occurring in the central administrative support operations and similar related institution-wide operations. Administrative data processing, space management, and personnel operations are examples of activity sites belonging in this category.

6.400 Logistical Services - Expenditures for activities that provide for the procurement of services and the orderly movement of support materials. Purchasing, printing, security, transportation, and similar operations are included.

6.500 Operation and Maintenance of Plant - Expenditures of current operating expense funds for activities involved in the operation and maintenance of the physical plant and the net charge amounts allocated to auxiliary enterprises and hospitals. All operations established to provide maintenance and services related to campus grounds and facilities are included. Fire protection, property insurance, utilities and similar items are included. Plant fund expenditures are excluded.

6.600 Faculty/Staff Services - (See: Auxiliary Enterprises 7.660.)

6.700 Community Relations - Expenditures for activities that establish and maintain fund-raising, development functions, and relationships with alumni, other constituents, and the community in general.

7.000 AUXILIARY ENTERPRISES - Expenditures for activities occurring in entities existing for the purpose of providing services to faculty, staff, and students, on a charged fee basis. The fee charged must be directly related to the service received, but it may or may not equal the full cost of the service received. The general public may coincidentally be served by some of these enterprises, but the intent is for an essentially self-supporting enterprise managed for the benefit of institutional personnel: employees and students. Residence halls, campus stores, food services and athletic events are examples. All costs, except depreciation of capital outlay, are included if related to operating the auxiliary enterprise. Charges for operation and maintenance of facilities and for general institutional support are included on a proportionate share basis.

7.550 Auxiliary Enterprises--Student - Expenditures and charges for activities furnishing services primarily to students. Intercollegiate athletics are excluded, but student health services are included when operated as an auxiliary enterprise.

7.560 Intercollegiate Athletics - Expenditures for activities directly related to and supporting the intercollegiate athletic program in-so-much as it is operated as an auxiliary enterprise.

7.660 Auxiliary Enterprises--Faculty/Staff - Expenditures and charges for activities furnishing services primarily intended for faculty and/or staff. Activities such as faculty/staff parking, faculty housing, and a faculty club are included.

8.000 SCHOLARSHIPS AND FELLOWSHIPS - Disbursements issued as outright grants and stipends to students enrolled in formal course work of any kind. Student loans, workships, and faculty/staff tuition or fee waivers are not included in this category. Criteria for determining expenditures for this category are as follows: (a) the expenditure must be from the current funds groups, (b) the school must have fiscal control of the funds, (c) the student should not be required to either render a service as a condition for receiving the monies or repay the money at some future date as condition for receiving it, and (d) the school must have the right of selecting recipients.

Exclusions:
1. Loans to students (these are not expenditures).
2. College Work/Study (these are expenditures where the work occurred).
3. Trainee stipends awarded to individuals not enrolled in courses (these are expenses of the organizational unit where they perform service).

8.100 Scholarships - Grants, trainee stipends, tuition and fee waivers, and prizes to undergraduates enrolled in the school.

8.200 Fellowships - Grants and traineeships to graduate students enrolled in the school, but who are not required to perform a service in return.

9.000 DEBT SERVICE AND GRANT MATCHING - Transfers of current funds which are required to meet legal obligations established in binding agreements of the governing body of the institution.

9.100 Debt Service on Educational Plant - Mandatory debt-service expenditures for academic buildings: (a) amounts set aside for debt retirement and interest, (b) amounts set aside for renewals and replacements to the extent such is not financed from other sources.

9.200 Debt Service on Auxiliary Enterprise - Mandatory debt-service expenditures for auxiliary enterprises: [(a) and (b) as above in 9.100].

9.300 Debt Service on Hospitals - Mandatory debt-service expenditures for hospitals: [(a) and (b) as above in 9.100].

9.400 Loan Fund Matching Grants - Mandatory transfers to loan fund accounts as required to match grants from outside sources such as the federal government.

9.500 Other Mandatory Transfers - Mandatory transfers not included elsewhere.

INDEPENDENT OPERATIONS - Expenditures for operations that are not directly related to the primary missions of the institution; i.e., instruction, research, and public service (generally limited to expenditures for the operation of major federally funded research laboratories).

The objects of expenditure definitions are as follows:

OPTION C

100 SALARIES

Amounts paid to employees of the LEA who are considered to be in positions of a permanent nature or hired temporarily, including personnel substituting for those in permanent positions. This includes gross salary for personal services rendered while ON THE PAYROLL of the LEAs.

Base salary. Salaries attributed to permanent and temporary instructional personnel; including substitutes, during the scheduled school year.

Extended salary. Salary attributed to days of instruction beyond the scheduled school year, and supplements for vocational activities only.

Aggregate salary. An individual's total salary which includes base, extended and supplementary money.

200 EMPLOYEE BENEFITS

Amounts paid by the LEA in behalf of employees; these amounts are not included in the gross salary, but are over and above. Such payments are fringe benefit payments, and, while not paid directly to employees, nevertheless are part of the cost of salaries and benefits. Examples are: (a) Group Health or Life Insurance, (b) Constributions to Employee Retirement, (c) Social Security, (d) Workmen's Compensation, and (e) payments made to personnel on sabbatical leave.

300 PURCHASED SERVICES

Amounts paid for personal services rendered by personnel who are not on the payroll of the LEA, and other services which the LEA may purchase. While a product may or may not result from the transaction, the primary reason for the purchase is the service provided.

330 TRANSPORTATION SERVICES

Expenditures for transporting students to and from school.

400 SUPPLIES AND MATERIALS

Amounts paid for material items of an expendable nature that are consumed, worn out, or deteriorated by use; of items that lose their identity through fabrication or incorporation into different or more complex units or substances. Reference is made to Appexdix A for the criteria for distinguishing between a supply and an equipment item and for a detailed list of supply and equipment items.

500 CAPITAL OUTLAY

Expenditures for the acquisition of fixed assets or additions to fixed assets. They are expenditures for land or existing buildings; improvements of grounds; construction of buildings; additions to buildings; remodeling of buildings; initial equipment; additional equipment; and replacement of equipment.

600 OTHER OBJECTS

Amounts paid for goods and services not otherwise classified above. This includes expenditures for the retirement of debt, the payment of interest on debt, payments to a housing authority, and the payment of dues and fees.

The capital outlay definitions are as follows:

500 CAPITAL OUTLAY

An expenditure which results in the acquisition of fixed assets or additions to fixed assets which are presumed to have benefits for more than one year. It is an expenditure for land or existing buildings, improvements of grounds, construction of buildings, remodeling of buildings, or initial, additional, and replacement of equipment.

510 Land

Expenditures for the purchase of land.

520 Buildings

Expenditures for acquiring buildings and additions, either existing or to be constructed. Included are expenditures for installment or lease payments (except interest) which have a terminal date and result in the acquisition of buildings, except payments to public school-housing authorities or similar agencies. Expenditures for major permanent structural alterations and the initial or additional installation of heating and ventilating systems, electrical systems, plumbing systems, fire protection systems, and other service systems in existing buildings are included also.

530 Improvements Other Than Buildings

Expenditures for the initial and additional improvements of sites and adjacent ways after acquisition by the LEA consisting of such work as grading, landscaping, seeding, and planting of shrubs and trees; constructing new sidewalks, roadways, retaining walls, sewers and storm drains; installing hydrants; initial surfacing and soil treatment of athletic fields and tennis courts; furnishing and installing for the first time, fixed playground apparatus, flagpoles, gateways, fences, and underground storage tanks which are not part of building service systems; and demolition work. Special assessments against the LEA for capital improvements such as streets, curbs, and drains are also recorded here.

540 Equipment

Expenditures for the initial, additional, and replacement of items of equipment, such as furniture and machinery. These costs are capitalized only when the material unit meets ALL of the following conditions:

1. It retains its original shape and appearance with use.
2. It is nonexpendable, that is, if the article is damaged or some of its parts are lost or worn out, it is usually more feasible to repair it rather than replace it with an entirely new unit (which is not true with supplies).
3. It represents an investment of money which makes it feasible and advisable to capitalize the item.
4. It does not lose its identity through incorporation into a different or more complex unit or substance.

550 Vehicles

Expenditures for the purchase of conveyance to transport persons or objects

560 Library Books

Expenditures for books which constitute the initial furnishing of a newly constructed library.

590 Other Capital Outlay

Expenditures for all other capital outlay not classified above.

610-640 Debt Service

Expenditures incurred for payment of interest and principal on all general obligation debt.

Other Selected Definitions

Direct Costs

Those elements of expenditure which can be easily, obviously, and conveniently identified with specific activities or programs.

Indirect Costs

Those elements of expenditure necessary in the provision of a service which are of such nature that they cannot be readily or accurately identified with the specific service.

Instructional Programs

The Instructional Programs dimension of the model identifies each vocational program according to the classification structure and definitions in Standard Terminology for Curriculum and Instruction in Local and State School Systems, Handbook VI. Additionally, the basic programs for the secondary school level and the postsecondary school level are defined.

One purpose of this dimension of the model is to establish the classification structure which will be used in identifying courses and other vocational education activities which are fundable through the federal Vocational Education Act (as amended). Another purpose is to classify by level the basic programs' courses. Finally, this program classification structure allows aggregation of the identified courses into program cost centers for analyses and comparisons.

The program element definitions are as follows:

Agricultural Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry into and/or advancement in occupations directly related to agricultural production, agricultural supplies/services, agricultural mechanics, agricultural products (processing), ornamental horticulture, forestry, and agricultural (natural) resources. All courses and learning experiences must qualify by definition for classification in the USOE course code category 01.XX XX XX XX to 01.99 XX XX XX.

Distributive Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry into and/or advancement in occupations directly related to the flow of goods and services, their control and their appropriate utilization, from the producers to the consumers or users. Learning experiences are provided in areas such as selling and the sales supporting functions: buying, transporting, storing, promoting, financing, marketing research, and management. Those courses and learning experiences in the field of marketing and distribution which qualify by definition for classification in the USOE course code category 04.XX XX XX XX are distributive education.

Health Occupations Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry into and/or advancement in occupations which support and assist professional personnel qualified to provide diagnostic, therapeutic, preventive, restorative, and rehabilitative health services to patients. All courses and learning experiences must qualify by definition for classification in the USOE course code category 07.0X XX XX XX to 07.99 XX XX XX.

Home Economics Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for either (a) rewarding personal, home and family living; or (b) entry into and/or advancement in occupations relating to the care and guidance of children; clothing management, production and services; foods preparation, management and service; and individual and institutional home furnishings, equipment, and supporting services. All courses and learning experiences must qualify by definition for classification in the USOE course code category 09.01 XX XX XX or 09.02 XX XX XX.

Office Occupations Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry and/or advancement in occupations related to the facilitation function of office work in both public and private organizations. Emphasis is on the expediting role as the connecting link between the production and distribution activities of the organization. Learning experiences are provided in areas such as: the recording, storage, management and retrieval of data; supervision and coordination of office activities; external and internal communications; and the reporting of information. All courses and learning experiences must qualify by definition for classification in the USOE course code category 14.0X XX XX XX to 14.99 XX XX XX.

Technical Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry into and/or advancement in occupations of a para-professional nature, at a level between the skilled craftsman and the professional scientist or engineer. Learning experiences are provided in both the underlying sciences and mathematics inherent in the specific technology, and the specialized methods, materials, processes and skills performed in the technology. All courses and learning experiences must qualify by definition for classification in the USOE course code category 16.0X XX XX XX.

Trade and Industrial Education - includes various combinations of subject matter courses and learning experiences designed to prepare individuals for entry into and/or advancement in semi-skilled or skilled occupations usually concerned with layout design, production, processing, assembling, testing, maintaining, servicing and/or repairing a product or commodity. All courses and learning experiences must qualify by definition for classification in the USOE course code category 17.XX XX XX XX.

Other Vocational Education - includes various combinations of learning experiences, subject matter courses and/or other student activities, designed to either prepare individuals for entry into specific vocational education programs or provide cocurricular club activities related to a vocational program and supporting the purposes of that vocational program. All courses and learning experiences qualifying for Prevocational or Pretechnical classification in accordance with the federal Vocational Education Act (as amended) and classified in U.S.O.E. Course Code category 10. XX XX XX XX are included. The cocurricular clubs directly associated with vocational programs, such as F.B.L.A. (U.S.O.E. code 20.01 11 00 00), F.H.A. (U.S.O.E. code 20.01 12 00 00), V.I.C.A. (U.S.O.E. code 20.01 33 00 00) or others are included.

Basic Program (Secondary School) - every course and activity in the secondary school instructional program, as locally defined, except specialized programs (such as vocational education, special education, and/or compensatory education) comprise the basic program. If the secondary school is not locally defined as a separate unit in fiscal accounting, the U.S.O.E. Handbook IV definition for secondary school, as follows, will be used: "A school comprising any span of grades beginning with the next grade following an elementary or middle school and ending with or below grade 12."

Basic Program (Postsecondary) - every course which is designed by the local institution to be used as transfer credit to a four year institution but excluding any credit course which is considered a part of the vocational technical program. (U.S.O.E. course numbers will be the basis for this determination.)

Suggested Data Processing Coding Structure

The following suggested data formats relate to the data instruments suggested in the User's Manual for determining the added costs of vocational education programs.

B-1 Basic Program Costs and Indirect Cost Attribution

CARD #	FIELD DESCRIPTION		CARD COLUMNS	FIELD LENGTH
B1	Agency Number		1-4	4
	Total Agency Enrollment		5-13	6.2
	Total FTE Teachers		14-21	5.2
	Total Instruction		22-30	9
	*Secondary	Postsecondary		
	Student Support	Libraries	31-38	8
	Instructional Support	Museums	39-46	8
	General Administration	A/V Services	47-54	8
	School Administration	Computing Support	55-62	8
	Transportation	Ancillary Support	63-70	8
	V/T Transportation	Academic Admin.	71-78	8
	Card Number		79-80	2
B2	Food Services	Curriculum Development	1-8	8
	Other 2500	Academic Pers. Develop.	9-16	8
	Central Services	Student Services	17-24	8
	Other Regular	Institutional Support	25-32	8
	Community Services	Aux. - Students	33-40	8
	Nonprogram	Aux. - Athletics	41-48	8
	Debt Services	Aux. - Faculty/Staff	49-56	8
	Open for Development		57-78	22
	Card Number		79-80	2

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*Items #14-#26 differ between secondary and postsecondary agencies. However, their coding structure is the same since the summations are accomplished independently in the computational routines.

V/T-1 Vocational-Technical Course Data

CARD #	FIELD DESCRIPTION	CARD COLUMNS	FIELD LENGTH
1	Agency Number	1-4	4
	School	5-7	3
	Instructor Number	8-18	11
	Instructor Name	19-38	20
	Course Title	39-58	20
	Course Number	59-67	2.6
	Building Number	68-71	4
	Open for Development	72-79	8
	Card Number	80	1
2	Student Contact Hours/Week	1-2	2
	Course Term/Weeks	3-4	2
	Instructor Load	5-8	1.2
	School Term	9	1
	Year	10-11	2
	Part	12-17	6
	Project	18-23	6
	Open for Development	24-79	56
	Card Number	80	1
3	Student's Last Name	1-17	17
	First Name	18-30	13
	Middle Initial	31	1
	Sex	32	1
	Race	33	1
	Age	34-35	2
	Grade	36-37	2
	Disadvantage/Handicapped	38-39	2
	Compensatory	40	1
	Occupation/Program Code	41-45	3.1
	Student Contact Hours	46-49	4
	Address - Street	50-79	30
	Card Number	80	1
4	Address - City	1-17	17
	Address - Zip Code	18-22	5
	Open for Development	23-79	57
	Card Number	80	1

V/1-2 Vocational-Technical Direct Course Costs

CARD #	FIELD DESCRIPTION	CARD COLUMNS	FIELD LENGTH
5	O.E. Course Number	1-9	2.6
	Instructor Number	10-20	11
	Instructor Name (Last, FI, MI)	21-40	20
	Instructor Load	41-44	1.2
	FTE Students	45-51	3.3
	Instructor Salary	52-56	5
	Instructor Benefits	57-60	4
	Purchased Services	61-65	5
	Materials & Supplies	66-70	5
	Other	71-74	5
	Capital Outlay	75-79	5
	Card Number	80	1
6	Part	1-6	6
	Project	7-12	6
	Program Code	13-14	2
	Program Title	15-34	20
	Open for Development	35-79	45
	Card Number	80	1

V/T-3 Vocational-Technical Other Personnel Program Costs

CARD #	FIELD DESCRIPTION	CARD COLUMNS	FIELD LENGTH
7	Employee Number	1-11	11
	Employee Name (Last, First, MI)	12-31	20
	Position Code	32-36	5
	Employee Salary	37-41	5
	Employee Benefits	42-45	4
	First Proration - Area	46-47	2
	First Proration - Percent	48-50	3
	Second Proration - Area	51-52	2
	Second Proration - Percent	53-55	3
	Third Proration - Area	56-57	2
	Third Proration - Percent	58-60	3
	Open for State/Local Development	61-79	19
	Card Number	80	1

V/T-4 Vocational-Technical Unassigned Program Costs

CARD #	FIELD DESCRIPTION	COLUMNS	FIELD LENGTH
8	Program Area	1-2	2
	Instr. Purchased Services	3-9	7
	Instr. Materials & Supplies	10-16	7
	Instr. Other	17-23	7
	Admin. Purchased Services	24-30	7
	Admin. Materials & Supplies	31-37	7
	Admin. Other	38-44	7
	Capital Outlay	45-52	8
	Open for State/Local Development	53-79	27
	Card Number	80	1

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The stated purposes of this project were to develop and test a model for determining the added-costs of vocational-technical education programs and courses. The basic structure of the model was established such that vocational-technical courses were the program units-of-analysis; postsecondary institutions, area vocational schools, and school districts were the organization units-of-analysis; and, student accounting data and fiscal accounting data were the data elements of interest. The planned product of this activity, a User Manual capable of being applied by researchers and program management personnel at the local and state educational agency levels, is contained in Chapter 4 of this Report. Chapter 3 of this Report describes both the processes and results of the field-tests activity.

Program Data

Course numbering schemata are esoteric among secondary and postsecondary institutions. For purposes of state reporting of vocational data (student and fiscal), special purpose data are generated, often requiring a translation of locally developed course numbering schemes into the standard two, four, or six-digits U.S.O.E. structure. Given the data base and data processing sophistication identified at several sites visited, those translations could be readily accommodated through a simple sub-routine in the data processing design.

The U.S.O.E. course classification system is generally inadequate to distinguish discretely the array of course offerings identified even in the small sample utilized in this project. The problem does not relate so much to the coding structure as much as it relates to assignment of common numbers for common courses. It was observed that consistency generally existed at the four digit level (e.g., 01.03) but was generally unreliable beyond that level of assignment. Also, some educational agencies made no attempt to go beyond the program area designator (e.g., 01.) for reporting purposes. This finding exacerbated the efforts to obtain accurate vocational-technical courses data of interest. However, it was recognized that generally, a course offered at the secondary level was not of the same content and experience offered at the postsecondary level. To assign common course titles in those instances would generate erroneous information and may, in fact, lead to inappropriate decisions based on that information. It was for the latter reason that the model described in Chapter 4 moved the unit-of-analysis from the course-level to the program area level and supplemented the analysis by offering a course-cost algorithm for potential users.

No attempt was made throughout this project to relate appropriate vocational-technical courses to U. S. Department of Labor Occupation Codes since that activity would have been well beyond the scope of this project. However, it became increasingly clear to site auditors that program compatibility does not exist between organizational levels (secondary and postsecondary) and often does not exist within organizational levels. It is recognized that vocational educators have addressed this problem in the past and continue to do so; however, for costing purposes, the lack of program definition requires one to aggregate data at the program area level only, e.g., Agriculture, Health Occupations, and so forth. Even at that level it was observed that some of the same courses were assigned to different program areas.

Student Accounting

The model was tested, by design, at sites which utilized a variety of student accounting practices. The student accounting practice which does the most violence to the integrated data sets is the average-daily-attendance (ADA) method. That statistic tends to understate course and program enrollments between 8 and 10 percent according to our site consultants.

Secondary and postsecondary educational agencies which utilize a full-time-equivalent (FTE) student statistic do so on the basis of one or more specific enrollment surveys. Discussions with site consultants and the literature review both point to the need for student accounting based upon student contact hours. That statistic is the only one identified that relates directly to tasks. Given an appropriate enrollment survey date, irrespective of the length of the course term, the full-time equivalent student enrollment may be computed as follows:

$$\frac{\text{Course Enrollment} \times \text{Course hours/week} \times \text{Course weeks}}{\text{FTE Student/hours/week} \times \text{Annual term in weeks}} = \text{Full-time Equivalent Enrollment}$$

Various applications of the above formula were made throughout this project and it was found to be serviceable both among secondary and postsecondary sites. Also, if a site accounts student populations in terms of days rather than weeks, the formula may be applied on that basis. It should be evident that the product of course-hours/week and course-weeks is the operational definition of student contact hours per term. Several school districts, area vocational schools, and community colleges computed student contact hours for internal management purposes and one state utilized that statistic for funding purposes.

Fiscal Accounting

A variety of fiscal accounting structures was encountered by site auditors. That was expected since the sample was structured for that purpose (see Chapter 1 criteria). The basic unit of analysis in fiscal accounting structure is dollars per unit, and unit represents a particular object-of-expenditure. The literature review suggested several structures for purposes of expenditure analysis, yet most were consistent with that offered in U.S.O.E.'s Handbook II, Revised.

Particularly troublesome is the problem of relating objects-of-expenditure to courses since accounting structures among educational agencies rarely aggregate data in that manner. Although some agencies visited seem to have incorporated various planning-related elements in their fiscal accounting structures (especially those who utilize the Higher Education General Information System), it is evident that agency comptrollers focus primarily on the control function of accounting.

Although our design for collecting fiscal data sought to relate operations and maintenance expenditures to time-space utilization we found it to be totally impractical at most sites (although one site does that as a matter of routine practice) due to lack of data base relative to space utilization. Also, capital outlay expenditures for buildings, sites, and equipment were fugitive among the majority of sites visited. Only two sites could produce an equipment register identifying all equipment, its program area assignment, and its historical cost (one site computed an annual depreciation value for each item of equipment).

The cost model presented in Chapter 4 identifies the expenditure elements and attribution bases suggested for cost determination of vocational program

TABLE 5.1

SUMMARY OF PROGRAM COST INDICIES

PROGRAM AREA ------------ AGENCY	Basic Cost Per Student	Agri. 01	Dist. 04	Health Occup. 07	Home Es. 09	Office Occup. 14	Tech. 16	Trade/ Indust. 17	Other V/T 99	All V/T
Secondary										
A	$1,063	1.39	0.80	1.26	0.90	0.88	1.92	1.25	0.91	0.96
B										
C	1,184	1.32	0.76	----	0.95	1.17	----	1.33	0.96	1.12
D	1,665	1.45	----	1.57	----	----	4.29	1.26	----	1.35
E	932	3.37	1.31	----	0.95	0.85	----	0.98	----	1.00
F	1,831	----	----	----	1.01	0.84	----	0.57	1.01	0.85
G	1,191	1.38	0.80	0.89	0.90	0.91	----	1.33	----	1.04
Median	$1,188	1.39	0.80	1.26	0.95	0.88	3.11	1.26	0.96	1.02
Postsecondary										
H	$ 784	3.26	1.57	5.43	1.80	1.97	2.27	3.31	1.21	2.62
I	1,272	2.94	2.64	3.05	2.92	3.20	1.42	2.18	3.90	2.69
J	775	0.95	0.69	2.07	1.05	0.81	1.79	0.88	----	1.12
K	2,655	0.40	----	1.03	----	0.60	0.87	0.54	----	0.59
L	4,147	0.74	1.04	0.89	0.81	0.95	1.29	1.06	0.53	1.06
M	1,453	1.03	0.97	1.92	0.64	0.62	0.55	0.62	1.58	0.79
N	925	0.80	0.85	1.77	0.62	1.12	1.07	1.78	----	1.27
Median	$1,272	0.95	1.01	1.92	0.93	0.95	1.29	1.06	1.40	1.12

areas and "basic" programs. Table 5.1 presents a summary of the program cost indices computed for the secondary and postsecondary sites visited. Generally, no economies of scale were evident in the aggregated program area costs.

Conclusions

Program Data

1. Much work needs to be done by vocational program specialists to establish more compatability among educational agencies in their use of the U.S.O.E. vocational course numbering scheme.

2. Vocational courses should be related to programs that relate to U. S. Department of Labor Occupation codes.

3. Vocational courses at the secondary school level, except in a few instances, seem to be more job orientation than job entry training. If that unplanned observation is correct, then vocational program specialists need to investigate the degree of program articulation between secondary and postsecondary offerings and to identify the nature of skill transfers between occupations.

4. A need for a common definition of "basic" program exists. Although the data available required a compromise for purposes of this project that compromise is not satisfactory for management purposes.

Student Accounting

1. The various bases of student accounting utilized by secondary and postsecondary are incompatible for purposes of inter-organization comparisons.

2. The average-daily-attendance method of student accounting does not relate to vocational program instruction tasks or to resource needs to accommodate those tasks.

3. Student contact hours is the best student accounting method for measuring program participation units and for computing full-time equivalent students.

Fiscal Accounting

1. Objects-of-expenditures provide the common basic structure for relating expenditures to courses and program areas. Identification of expenditure functions may be very helpful in identifying "basic" program costs.

2. Generally, any attempt to isolate costs of special education for the handicapped would require a similar application of the cost model reported in Chapter 4.

3. Data are not generally available and would require extensive auditing to determine both value of capital investments by vocational program area and to relate time-space utilized for purposes of prorating costs to program.

4. Generally better data bases exist at the postsecondary institutions and except in two cases, the basic program costs per student were not generally greater than the secondary program basic student costs.

5. The data elements of interest utilized in the cost model may be determined at both secondary and postsecondary sites irrespective of their fiscal accounting basis and sophistication.

Recommendations

Several recommendations are evident from the conclusions stated above. One specific caveat is well worth repeating here. Since the primary objective of this study was the development and testing of a cost model, the data reported in Table 5.1 should not be utilized for policy formulation. A different type of sample would be required for that purpose.

1. It is recommended that the Bureau of Occupational and Adult Education plan to implement the cost model at appropriate sample sites for a period of two years for purposes of establishing data appropriate for policy formation.

2. It is recommended that capital costs associated with vocational programs be maintained as memorandum accounting.

3. It is recommended that "start-up" costs and "marginal" cost analyses be performed and the results be made known to local and state vocational educational program managers.

4. It is recommended that the Bureau of Occupational and Adult Education and the Bureau of Education for the Handicapped engage in a joint effort to isolate program costs of interest and provide a common basis of analysis.

5. It is recommended that the cost model produced in this project be applied at the state-agency level in a selected number of states who have already developed sophisticated management information systems (MIS) to support statewide planning and evaluation models. The product of that activity would be an integrated planning, budgeting, evaluating, management design.

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Site A, a community college, serves a population base of over 400,000 people in ten counties in this eastern state. As a result of the institution's evolution from a technical institute, it serves both secondary and post-secondary students. The secondary program, serving approximately 1,600 students, is entirely vocational-technical. The post-secondary program also has a heavy vocational emphasis, with over 1,700 of its approximately 2,500 FTE students enrolled in vocational-technical programs.

The commitment of this institution to improving vocational education services is indicated by a two million dollar vocational capital outlay over the last three years. The vocational programs offered here include all USOE vocational program areas except home economics and distributive education, with heaviest enrollments in office occupations, agriculture, and technical program areas. The college also assists other state agencies by offering vocational programs at a nearby state penitentiary.

Enrollment data, using student contact hours as student accounting methodology, was easily accessible at this site through computer printouts, except for the summer terms. The latter required cross checking of documents and the assistance of site administrative personnel.

The college did have administrative costs, contracted services, and instructional supplies clearly identified and broken out by college division. However, as the divisions did not match USOE groupings, pro-rating was required.

Overall, the data at this site was of sufficient quality to enable cost accounting at the program level. However, the lack of fit between the institution's program groupings and the USOE groupings would cause some difficulty.

It is to be noted that the young administration at this site was very professional and cooperative in its outlook and behavior. Their assistance was always readily available.

Site B is a vocational-technical school serving a geographic area including several towns and small cities and a population of over 200,000. The largely industrial and commercial economy of the area is reflected in the program area offerings and enrollments in the school.

Like many vocational-technical schools, site B has both a secondary program and a smaller adult vocational education program. Unlike many, this site includes a regular academic program in addition to the vocational, enabling an on-site basic program comparison. In terms of vocational curricula and enrollment, the school offers courses in all seven USOE vocational program areas, but heaviest enrollments are in trade and industrial and technical areas. Total vocational enrollment, computed on an average daily membership basis, is over 1,500 students.

Fiscal data at this site was excellent in detail and interpretability, enabling very accurate cost assignments at the program level in spite of a lack of computer capability. However, pupil accounting data at this site was rather sparse, providing only enrollment figures at the program area level. Capturing individual course enrollents would have required location and persual of all individual teacher attendance registers.

Overall, this site is to be complemented on its modern facilities, program offerings, and for the professional attitudes and cooperation of its administration.

Site C is one of 6 junior colleges created by the legislature in this western state. The college primarily serves two counties in the southern part of the state. It is located in the largest town in the area it serves, a small city of over 20,000 population.

Like most community colleges, this institution has the multiple missions of college transfer general education, vocational education, adult continuing education, and community service. The college also has developed special programs for the physically handicapped and for senior citizens. On the vocational education side, the college offers courses in all seven vocation program areas, with concentrations heaviest in trade and industrial, health occupations, and agriculture programs. The total vocational enrollment approaches 500 FTE students.

The vocational education data at this site is solid, providing a strong basis for potential cost-accounting at the program level. Student enrollment data is in the form of student contact hours. Personnel records, salary and fringe benefits data, administrative costs, expenditures for supplies, and other expenditure records are of high quality. However, the data was not in a completely assembled form which allowed immediate interpretation. Rather, location of the data was a major task in the data collection effort by the research team.

The assistance of the vocational director and business manager of the college, and their staffs, was extremely valuable. Their cordiality and professional attitude should also be noted.

Site D is a university with an enrollment of approximately 5,700 students. Unlike many states, this western state merges its postsecondary academic and vocational missions under the auspices of the regular state college and university system. At site D, over 1,200 of the 5,700 students are enrolled in vocational programs offered by the School of Vocational-Technical Education.

The School of Vocational-Technical Education at site D offers courses in all seven program areas, with a focus on offerings designed to provide occupational skills needed in the geographic area served by the site. Also offered within the Vocational-Adult Education Division are evening courses designed to provide training, retraining, or new skills needed for job advancement among those already in the labor market. Heaviest enrollment are within trade and industrial, technical, and office occupations programs, respectively.

Enrollment accounting at the site was simply in the form of enrollment in each course for the period specified, which was easily converted into student contact hours. However, fully accurate instructor assignment, by course, is much more difficult. Assignment of salaries and fringe benefits to programs is somewhat difficult as records are not kept in a program format at the School of Vocational-Technical Education level. At the program level, such assignment would best be done on a per student basis. The primary course and salary data that was available was that used by the institution for federal and state reports for reimbursement, which was not inclusive in terms of the entire vocational instructional program.

Fiscal data provided difficulties for the same reasons presented in the previous paragraph. It became almost necessary to indirectly prorate direct costs. Some materials and purchased services were attributable directly to the program level. Some administrative salaries and expenses were directly related to programs. Others had to be prorated. Proration of indirect costs was possible.

At this site, data is in a form which makes determining added costs at the program level somewhat difficult. At the course level, such determination would be extremely difficult.

Site E, a school district in a small Western city with an enrollment of over 10,000 students, has a secondary enrollment of over 5,200 students. Of the latter number, the enrollment in vocational education courses constitutes 366.6 full-time-equivalent students. The range of vocational courses offered at this site is typical of a high school program of a relatively small district in a community which is not a heavily industrialized area. Vocational programs offered include office occupations, home economics, trade and industrial (auto), and a small number of students in agriculture and distributive education. Technical and health occupations programs are not available. Courses offered within existing programs are primarily oriented toward the development of basic personal and occupational skills.

Through cooperative arrangements with a state college in the same town, the district (along with two other districts) offers vocational-technical mini-courses for disadvantaged students for high school credit at the state college. The school district funds the program in lump sum, maintains liability insurance, and provides transportation; while the college provides all facilities, instructors, and materials needed in the vocational instruction. These courses extend the high school offerings in distributive education and trade and industrial areas and open opportunities in technical program areas.

Pupil enrollment data, based on ADA, was available in a first semester count, by course and section. Course data, with teacher assignments was readily available, including contact hours per week (discerned by examining individual school schedules). This would enable conversion to FTE student accounting.

Allocation of salaries and fringe benefits to programs was enabled by detailed salary and fringe benefits data. Such salaries and benefits could easily be attributed at the course level, per teacher or per pupil. However, per teacher would be less time consuming, given the form of the data.

Other costs vary in the difficulty of their attribution at site E. Administrative costs were easily prorated at the program level. Supplies unique to the vocational programs were readily attributed at the program level, but not at the course level. Indirect cost data were sufficient to prorate the costs to programs and/or courses.

The data at this site is such that added cost accounting for vocational programs could be readily accomplished, due to the relatively small scale of the operation. It would be difficult to accomplish such cost accounting at the course level.

Site F consisted of an area vocational center attached to a community unit district in a small midwestern city which could be characterized as a lovely home-town community with both industrial and agricultural bases. The city had been hard-hit by unemployment in the industrial sector during the recent recession. The district has an enrollment of approximately 7,600 students, including about 1,800 at the high school level. In reality, the area vocational center was primarily an operation of this school district, with several students from surrounding districts attending on a tuition basis.

Except for the inclusion of the health occupations program, the programs of the area vocational center were more typical of a high school program than that of a formally designated area vocational center in the size of the operation and breadth of offerings. The staff had been recently reduced in size due to budgetary problems of the district.

Cooperation was readily and genuinely extended, but expertise to respond to the data collection needs of the site visitation team was not always so available. The director of the center used pupil accounting, teacher assignment data, and cost data collecting and reporting methods which worked for him in his situation, but which caused the team interpretation problems. The role of district fiscal officer was being filled by the acting superintendent of the district, who had taken over the fiscal role due to an administrative staff reduction forced by budgetary and declining enrollment problems. He did all that he could to assist us, but lacked the in-depth background in educational finance to respond effectively to several questions. It must be emphasized that the administrative staff was doing the best it could under difficult circumstances.

Use of all data forms presented some difficulty at this site. Available data often lacked detail and were sometimes confusing in format. Location of support documents was sometimes difficult. Student accounting was based on ADA, but provided conflicting numbers, and excluded enrollments in courses for which the center was not reimbursed from state and federal sources. Added cost accounting would currently be difficult at this site.

Site G is a relatively new community college serving an industrial city and surrounding counties with an economic mixture of agriculture and industry -- heavy machinery and vehicle production. Facilities at this site are excellent, and faculty and staff exhibit high morale and cooperative attitudes.

This college has a strong vocational orientation, with over 1,500 FTE students enrolled in vocational programs and courses. It offers instructional programs in all seven of the USOE vocational program areas, with heaviest enrollment in office occupations, trade and industrial, technical, health occupations, and distributive education programs, respectively. The college makes excellent use of community resources to provide an instructional program in vocational education of greater breadth and depth.

The data collection team worked closely with the dean of the vocational-technical division and the college comptroller, both of whom provided invaluable assistance. With open access to all needed documents, the major task was recording the data, seeking out isolated bits of information not included in the reports, and seeking interpretation of specific items and formats. The team was able to obtain a print-out of the equipment inventory by program, and of course, enrollments backed by catalog descriptions.

The data collection indicated that a high level of reporting accuracy was typical of the institution, but that the cost analysis expertise was not that of site I. The cost of contracted services and instructional supplies could be directly related to course or program level. However, student accounting in a credit hour form was of excellent quality, as were instructor assignment and salary data.

The college comptroller had recently revised the accounting and recordkeeping procedures of the college to conform to the NCHEMS and HEGIS systems, and was highly interested in potential applicability of the study for reporting and budgeting practices of the college.

Site H was a community unit district in the Midwest. The community which the school serves is a mixture of a suburban commuter community for people working in a nearby industrial center, a resident industrial community centered around a large automobile plant, and an agricultural community. The community could be characterized as a well-groomed hometown community with a better than average per capita income.

The enrollment of the high school was listed as almost 1,700 students, of which over 300 were enrolled in vocational programs. The school has vocational offerings in every program area except health occupations and technical, with heaviest enrollments in office occupations and trade and industrial program areas. Even health occupations and technical programs are available to students at this school through a cooperative arrangement with a nearby area vocational center.

The district is fortunate to have a highly conscientious vocational director and a skilled business manager -- both of whom extended superb cooperation to the site visitation team. With the advance preparation done by these two individuals, data collection was easy at site H. The quality of student accounting (using ADA), salary data, administrative costs, purchased services, instructional supplies, and capital outlay data was excellent at this site. Program cost accounting at either the program or course level would be possible at this site, even though much of the data is collected and processed manually. The only areas in which detailed breakdowns were not available were for contracted courses with the area vocational center for 17 students.

Site I, a large metropolitan community college in the Midwest with an enrollment of over 17,000 FTE students, and over 8,000 of those in vocational courses and programs, was among the largest sites visited in this project. The campus is relatively new, with excellent facilities. The institution takes pride in its strong vocational orientation, and offers a wide array of courses of study in all seven of the USOE vocational program areas, with largest enrollments in trade and industrial, office occupations, and health occupations program areas. It should be noted that this site makes excellent use of community resources in both its vocational and adult continuing education programs.

After a relatively cool reception by the administration of the vocational division of the college, the data collection team was left to ferret out information where it could find it. The business office, and particularly the staff of the computer center provided valuable assistance which enabled the team to find most needed data.

The HEGIS system was in use in course accounting, and the NCHEMS system in fiscal accounting. Quality of course, student accounting, and instructional cost data was excellent due to the expertise of the director of the computer center. Overall, the college has an exceptionally strong course and program cost accounting system with excellent computer analysis routines. However, some items were difficult or impossible to locate: salary supplements, adult continuing education staffing. The vocational division's use of USOE course codes was confusing, with exactly the same course given as many as four different USOE codes, even though the formal course designation remained the same.

Site J is a unified school district serving a large geographic area consisting of light industry, farming, and a military establishment. Local tax revenues for schools have doubled during the previous two years, while state revenue has increased about five percent per year. Federal revenue for schools has also doubled in the past two years, yet remains about at the state average of approximately eight percent of total revenues.

The school population of the district is as diverse as the economic base. The district offers a full range of vocational-technical courses, special education services, early childhood education, and bilingual-bicultural experiences for both Native Americans and Spanish-speaking students. The area is also served by a community college located in the largest city of the district. Cooperative facilities sharing and high school vocational enrollments in community college vocational courses were becoming well established.

Student enrollment accounting for vocational students was maintained by teacher, by school in ADA form. However, no attempt is made by the district to cost account by course or by program levels. Personnel records, expenditure records, and student enrollment records are of such quality that an integrated system of program-level and/or course-level cost accounting is feasible. The director of Vocational Education for the school district expressed an interest in such a system. (Various materials on that subject were mailed to the director subsequent to the team visit.)

Generally, records of the district are oriented toward federal and state reporting requirements. The relationship between the state-aid claim for vocational programs and the number of courses offered does not reflect the total costs incurred, but only reflect the maximum amount authorized by the state for reimbursement. That finding was typical among all of the school district sites visited.

The director of Vocational Education and the school business manager of the district, and their staffs, were most cordial and helpful to the data collection team. Records, facilities, and equipment were readily made available.

The school district's enrollment of approximately 13,300 in ADA included over 1,500 vocational students.

Site K is a school district with an enrollment of 7,760 elementary and secondary students and over 1,900 enrollees in continuing education, located in a large metropolitan area of a populous western state. This district has vocational education offerings in its high schools, but in order to provide more comprehensive vocational education opportunities to its students, also shares vocational educational education services with two neighboring school districts through a Regional Occupational Program (ROP). The ROP has an "Area Center" facility for some vocational offerings, but students from any one of the three districts might be enrolled in a vocational education offering in one of the other districts' high schools. Through such an arrangement, the breadth and depth of vocational offerings available to students is much greater than that which could be offered by a single district of comparable size, including offerings in all seven vocational program areas. Financially, this was paid for through a charge-back system agreed to in the ROP.

Student accounting records included categories for regular day students and adults as defined by the state. The student accounting measure used was the average daily attendance (ADA) in all programs. Local district and ROP discriminations are made in pupil accounting. Student counts for the enrollment year 1975-76 were taken in October and February. These counts provided data on student enrollment hours for each vocational course and program from which student contact hours could be computed.

This site had the financial data forms used in this project completed at the time of the data collection team's arrival. The additional required fiscal data were readily available from the fiscal officer and from records compiled by the director of instruction for use by his office staff. Very good data were available on expenditure by vocational program area.

The required teacher salaries and employee fringe benefits were readily available in a usable form. However, only teacher costs could be identified at the course level. The other expenses -- travel, supplies, etc. -- were only identified in existing records at the vocational program level.

Clean data and assistance provided prior to and during the site visit made this data collection effort smooth, quick, and thorough.

Site L, a community college in a western state serving a large geographic area and a number of counties and school districts, has an enrollment of over 11,000 students. Of these, approximately 2,100 students are enrolled in vocational programs. The range of vocational course offerings includes multiple courses in each of the seven vocational course areas, but not the range or depth of offering of an institution of comparable size which has a stronger vocational focus.

Vocational personnel information (Data Form 2C) information was obtained from the accountant's work sheets. Instructors in each program were identified, along with FTE equivalent assignment to the program, and base salary of the instructor.

Course data (Data Form 2) had to be manipulated. A computer printout entitled "Enrollment Report as of . . ." was dissected to assemble enrollment data by course and instructor. Data collected was in contact hours but was also available in credit hours. The determination of evening courses and their instructor assignment proved a problem. Personnel identified by the business office were not congruent with the instructors for the vocational courses as identified by the academic dean's office. Summer course offering data was not available, resulting in the necessity of approximating the costs for that term and subtracting those figures from the 1975-76 expenditures. The basic student accounting method used was ADA.

At this site, salaries can be assigned to programs readily, but not to courses. Substitutes are not related to particular courses and an occasional teacher salary appears without course assignment. Benefits are easily assigned by use of a percentage figure.

Supplies can be directly related to most programs, but not to courses. Administrative costs can be readily prorated to programs and courses, more appropriately on a per teacher basis. Data at the site was sufficient to prorate indirect costs. However, as personnel and student support services were given in one lump sum on the year end report, arbitrary assignment was required.

At site L, data is in a form of sufficient detail and accessibility for determining added costs at the program level. However, the determination of such costs at the course level would be difficult.

Site M is a community college of approximately 5,500 students located in a small town in a Western state. The service area for this institution includes three rural counties in which heavily mechanized agriculture is a major industry. The fifty-year-old college offers noncredit, certificate and degree-credit courses, with occupational courses of study making up a major portion of the curriculum. The college offers course work in all seven vocational program areas, with the curriculum reflecting the economy of the area. Enrollments are highest in office occupations, technical, and agriculture program areas.

The student accounting data were found in summarized form in semi-annual statistical reports published by the college. ADA is the student accounting measure employed for record-keeping and state required reports. The ADA, however, is computed from weekly student contact hours, and internal records were available at that level of detail. Other than sheer volume of data, no difficulty existed to bar acquisition and use of student contact hour data. Of particular note, however, is the fact that ADA was computed by the college in three different ways, dependent upon type and length of course, and the time of day or time of year in which the course was offered.

Effective summary financial data were found. The end of year expenditure data was arrayed in three aggregations based upon cost centers, programs, and activity codes. Object of expenditure and function classifications could be identified in the data summaries for most classifications. Unit equipment records and card files were used to maintain machine records and print reports.

Individual teacher salary data were available only from the official college copies of teacher contracts. Fringe benefit data were available only as a percentage of salaries plus insurance premiums.

Supplies, equipment, and administrative expenditures were available from state reimbursement application forms used to claim vocational education entitlements from the state. These data were available at the vocational program level.

The data at this site were generally available in disaggregated or detailed form rather than in a locally determined aggregation. Extensive summarization was required.